

BENEFITS BY DESIGN



Missouri State Employees' Retirement System
A Pension Trust Fund of the State of Missouri
Annual Comprehensive Financial Report
Fiscal Year Ended June 30, 2023



BENEFITS BY DESIGN

Abby Spieler, Executive Director
Jeremy Pond, Chief Financial Officer

Prepared by MOSERS' staff

Missouri State Employees' Retirement System
A Pension Trust Fund of the State of Missouri
Annual Comprehensive Financial Report
Fiscal Year Ended June 30, 2023



Table of Contents

Introductory Section	5 Professional Awards
	6 Letter of Transmittal
	10 Letter from the Board Chairwoman
	11 Board of Trustees
	12 Administrative Organization
	13 About MOSERS
	16 Outside Professional Services
Financial Section	17 Independent Auditor's Report
	20 Management's Discussion and Analysis
	<i>Basic Financial Statements</i>
	24 Statements of Fiduciary Net Position
	25 Statements of Changes in Fiduciary Net Position
	26 Notes to the Basic Financial Statements
	<i>Required Supplementary Information</i>
	52 Schedule of Changes in Employers' Net Pension Liability
	56 Schedules of Employer Contributions – Pension Trust Funds
	57 Schedule of Annual Money-Weighted Rate of Return on Investments – Pension Trust Funds
	58 Notes to the Schedules of Required Supplementary Information – Pension Trust Funds
	59 Schedule of Proportionate Share of the Net OPEB Liability
	59 Schedule of Employer Contributions for OPEB
	<i>Additional Financial Information</i>
	60 Schedules of Investment Expenses
	62 Schedule of Internal Investment Activity Expenses
	63 Schedule of Administrative Expenses
	64 Schedule of Professional Service Fees
Investment Section	65 Chief Investment Officer's Report
	66 Investment Policy Summary
	70 Total Fund Review
	72 Schedule of Fees and Commissions
	73 Schedule of Investment Portfolios by Asset Class
	74 Total Fund – Top Ten Publicly Traded Separate Account Holdings
	75 Schedule of Investment Results
	77 Schedule of Investment Manager Fees
	79 Asset Class Summary

Actuarial Section

89	Actuary's Certification Letter
92	Summary of Actuarial Assumptions
99	Employer Schedules of Funding Progress
100	Summary of Member Data Included in Valuations
101	Active Members by Attained Age and Years of Service
102	Schedules of Active Member Valuation Data
103	Retirees and Beneficiaries Added and Removed
105	Short-Term Solvency Test
106	Analysis of Financial Experience
	<i>Summary of Plan Provisions</i>
107	Comparison of Plans for General State Employees
109	Comparison of Plans for Legislators
111	Comparison of Plans for Statewide Elected Officials
113	Comparison of Plans for Judges
115	Comparison of Plans for Uniformed Members of the Water Patrol
117	Life Insurance Plans
118	Long-Term Disability (LTD) Insurance Plans
119	Changes in Plan Provisions
120	Actuarial Present Values

Statistical Section

123	Overview
124	Changes in Fiduciary Net Position
126	Deductions from Net Position for Benefits and Refunds by Type
128	Valuation Assets (Smoothed Market) vs. Pension Liabilities – Pension Trust Funds
130	Required Employer Contribution Rates as a Percent of Payroll – Pension Trust Funds
131	Membership in Retirement Plans
132	Distribution of Benefit Recipients by Location
133	Benefit Recipients by Type of Retirement and Option Elected
135	Benefits Tabulated by Type of Benefit and by Option
138	Average Monthly Benefit Amounts
145	Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement
147	Benefits Tabulated by Attained Ages of Benefit Recipients
149	Principal Participating Employers

MISSION

MOSERS exists to advance
the financial security of its members.

VISION

We endeavor to:

Exceed customer expectations

Educate stakeholders

Ensure sound investment practices

Encourage responsible funding
of the plan through a commitment to

Excellence. Always.

VALUES

Quality • Respect • Integrity

Openness • Accountability





INTRODUCTORY SECTION

Strategically focused on the development
and continued growth of MOSERS.

Professional Awards

Certificate of Achievement for Excellence in Financial Reporting

MOSERS' *Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2022, has been submitted, and is currently under review for the Certificate of Achievement for Excellence in Financial Reporting by the Government Finance Officers Association of the United States and Canada (GFOA). The Certificate of Achievement is the highest form of recognition for excellence in state and local government financial reporting. To be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized financial report.

Public Pension Standards Award

MOSERS received the Public Pension Standards Award from the Public Pension Coordinating Council (PPCC) in 2022, in recognition of meeting professional standards for plan design and administration as set forth in the Public Pension Standards. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators (NASRA), the National Conference on Public Employee Retirement Systems (NCPERS), and the National Council on Teacher Retirement (NCTR).



Letter of Transmittal



PO Box 209, Jefferson City, MO 65102-0209
(573) 632-6100 • (800) 827-1063 | (573) 632-6103 (fax)
mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

November 13, 2023

The Board of Trustees
Missouri State Employees' Retirement System
907 Wildwood Drive
Jefferson City, MO 65109

To the Board of Trustees and Members of MOSERS:

We are pleased to submit the *Annual Comprehensive Financial Report (ACFR)* of the Missouri State Employees' Retirement System (MOSERS) for the fiscal year ended June 30, 2023. During fiscal year 2023, the Board and staff worked extensively and collaboratively on solutions to ensure the fiscal sustainability of MOSERS for current and future members. I would like to thank our trustees for their dedication and commitment.

This ACFR is designed to provide an overview of the financial condition of MOSERS while also satisfying the reporting requirements of state law as stipulated in Sections 104.480, 104.1006, and 105.661 of the Revised Statutes of Missouri (RSMo), as amended. In addition to the *Introductory Section*, the MOSERS ACFR also contains a *Financial Section*, *Investment Section*, *Actuarial Section*, and *Statistical Section*. This report is available on our website at www.mosers.org.

Profile of MOSERS

MOSERS is a cost-sharing multiple-employer defined benefit pension plan that was established in 1957 by state law for the purpose of providing retirement benefits to most state employees. MOSERS is governed by an 11-member Board of Trustees (the Board). As of June 30, 2023, MOSERS serves 43,503 active employees and pays 55,328 benefit recipients across the Missouri State Employees Plan (MSEP) and the Judicial Plan.

In addition to retirement benefits, MOSERS administers term life and long-term disability insurance for most state employees. MOSERS provides these benefits through insured plans with The Standard Insurance Company (The Standard). We maintain membership information on those eligible and manage a custodial fund to track premiums collected from employers and payments made to The Standard.

MOSERS oversees the State of Missouri Deferred Compensation Plan (MO Deferred Comp). We administer this plan through a contractual relationship with MissionSquare Retirement as the third-party record keeper. The plan provides various investment options to participants who retain responsibility for the investment of their individual accounts. MO Deferred Comp activity and administrative costs are reported via separate audited financial statements.

Additionally, MOSERS oversees the Colleges and Universities Retirement Plan (CURP), a mandatory 401(a) defined contribution plan for education employees hired after June 30, 2002, by the regional universities that participate in MOSERS. TIAA is responsible for third-party administration and for providing investment products to plan members. The activities of CURP are not included within this report.

Financial Statements

The financial statements in this report were prepared in accordance with accounting principles generally accepted in the United States. Management is responsible for the preparation of this report and the fairness and integrity of the information presented herein. Some amounts included in the financial statements and elsewhere may be based on estimates and judgments. Management is responsible for maintaining a system of adequate internal controls designed to provide reasonable, but not absolute, assurance that assets are properly safeguarded and that the financial statements are fairly stated. We believe that the internal controls currently in place support this purpose and that the financial statements and accompanying schedules are fairly presented in all material respects.

Eide Bailly, LLP, our independent external auditors, conducted an audit of the *Basic Financial Statements* in accordance with U.S. generally accepted auditing standards. This audit and the financial statements and related notes are presented in the *Financial Section* of this report.

Management's Discussion and Analysis in the *Financial Section* serves as an introduction to, and overview of, the financial statements. Additional financial information can be found in the financial statements and schedules included in the *Financial Section* of this report.

MOSERS retirement funds are pension trust funds of the state of Missouri for financial reporting purposes and, as such, the financial statements in this report are also included in the *Annual Comprehensive Financial Report* of the *State of Missouri*.

Investments

The MOSERS investment portfolio generated a time-weighted return of 2.5%, net of fees, for fiscal year 2023. Despite it being a difficult year for the markets, the total fund returned 0.6% more than would have been expected through passive investing in the benchmarks.

The MOSERS Board of Trustees has adopted investment objectives, investment philosophies, and a strategic asset allocation to guide all investment related decisions. Investment objectives strive to maintain stable and reasonable contribution rates over long periods of time, while maximizing investment return by exposing assets to a prudent level of risk. Additional detailed information regarding MOSERS' investments, including policies and strategies, can be found in the *Investment Section* of this report.

Actuarial Information

The Board contracts with Cavanaugh Macdonald Consulting, LLC to perform an actuarial valuation of each plan every year. The valuations use economic and demographic assumptions adopted by the Board based upon experience studies conducted at least every five years. The most recent full experience study was adopted effective June 30, 2021.

To allow for more predictable and stable contribution rates, MOSERS' funding is based upon the actuarial value of assets, which smooths asset gains and losses over a five-year period. As of June 30, 2023, the MSEP was 57.6% pre-funded and the Judicial Plan was 31.7% pre-funded on an actuarial basis. The MSEP remained stable compared to the June 30, 2022, funded status of 57.7%. The Judicial Plan reflected a decrease from the June 30, 2022 funded status of 32.4%.

The required certification letter from the Board's retained actuary is included at the beginning of the *Actuarial Section*. Additional information regarding the financial condition of the pension trust funds can be found in the *Actuarial Section* of this report.

Legislative Changes

- **House Bill 5** – The General Assembly appropriated \$718 million to the Office of Administration to pay the required employer contribution payments to MOSERS in fiscal year 2024 to fund the MSEP, the Judicial Plan, life insurance premiums, and long-term disability premiums. The Governor signed House Bill 5 on June 30, 2023.
- **Senate Bill 20** and **Senate Bill 75** – Both of these bills contained cleanup provisions. Many of the statutory changes are administrative in nature and intended to clarify and/or eliminate inconsistencies in the law. Some of the noteworthy changes include removing the statutory requirement that the System's unfunded liability be determined using the percent of payroll amortization method, which provides MOSERS flexibility to explore alternative methods to fund the unfunded liability. The Governor signed Senate Bill 20 and Senate Bill 75 on July 6, 2023, and they went into effect on August 28, 2023.

Administrative Initiatives

MOSERS' staff was engaged in several administrative initiatives during the year. The more notable items are listed below.

- **Project Phoenix** – MOSERS' dedicated project team continues to work on the replacement of our pension administration system. MOSERS remains engaged with ICON Integration & Design for data profiling, analysis, and conditioning services, along with Linea Solutions for project oversight. Tegrit, utilizing their Arrivos platform, is proving to offer many opportunities for operational efficiency and further systems integration. Current projections indicate a 2024 deployment.
- **MOSERS' Strategic Plan** – The MOSERS Board of Trustees approved an organization-wide strategic plan for a three-year cycle beginning July 1, 2022, through June 30, 2025. During the first year, staff completed three initiatives and made significant progress on most others. All initiatives will be completed by the end of the strategic planning cycle.
- **MO Deferred Comp Employer Match Communication** – In July 2022, the state of Missouri approved the matching incentive for state employees. The MO Deferred Comp team engaged in a multi-faceted outreach approach to explain the match and how employees could increase their contributions and potential retirement savings. These outreach efforts helped increase overall participation by 7% compared to the prior year. The team produced a special video informing employees of the match, published multiple website articles, sent targeted emails to employees, and provided state agencies with information to pass on to their employees. The emails alone were clicked more than seven times the industry average.
- **MOSERS Month** – In April 2023, we hosted the third annual MOSERS Month. The 2023 theme was "Pension Possible" with unique weekly interactive video stories. Throughout the month, we encouraged active employees to explore the value of their benefits and learn more about retirement.

Awards

MOSERS received the Public Pension Coordinating Council (PPCC), Public Pension Standards Award, in recognition of meeting the professional standards for plan design and administration as set forth in the Public Pension Standards. This award is presented by the PPCC, a confederation of the National Association of State Retirement Administrators (NASRA), the National Conference on Public Employee Retirement Systems (NCPERS), and the National Council on Teacher Retirement (NCTR).

MOSERS received two awards from the National Association of Government Communicators (NAGC). These awards include the First-Place honors in the *Internal Communications* category for *MOSERS Month 2022*. We also received Second-Place honors in the *Digital Communications/Website* category for the *MOSERS Month* website. The Blue Pencil & Gold Screen Competition is an annual international awards program that recognizes superior government communication products and those who produce them at all levels of government.

Pension & Investments awarded the State of Missouri Deferred Compensation Plan a Second-Place Eddy Award for their Retirement Savings *Mythbusters* campaign.

These prestigious awards recognize MOSERS for financial and professional standards of excellence and reflect the dedication and competence of the MOSERS staff.

Conclusion

This report is a product of the combined efforts of the MOSERS staff and advisors functioning under the Board's leadership. It is intended to provide complete and reliable information that facilitates the management decision making process, serves as a means for determining compliance with legal requirements, and allows for the evaluation of responsible guardianship of System funds.

Digital copies of this report are provided to the Governor, State Auditor, and the Joint Committee on Public Employee Retirement of the General Assembly. Their support contributes to the success of MOSERS.

Respectfully submitted,

Abby Spieler, JD
Executive Director

Jeremy Pond, CPA, CFE, CGFM
Chief Financial Officer

Letter from the Board Chairwoman



PO Box 209, Jefferson City, MO 65102-0209
(573) 632-6100 • (800) 827-1063 | (573) 632-6103 (fax)
mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

November 13, 2023

Dear Members:

On behalf of the MOSERS Board of Trustees, I am pleased to present the *MOSERS Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2023. This report is one of MOSERS' finest examples of collaboration and an organization-wide team effort.

During the year ended June 30, 2023, the Board of Trustees continued its work on behalf of the MOSERS membership. The Board and MOSERS staff continued to work on key initiatives over the last fiscal year, some of which included:

- Completing three initiatives on the formal MOSERS fiscal year 2023 - 2025 strategic plan with significant progress on most of the other initiatives.
- Exceeding our policy benchmark return expectations, as set by the Board, by 0.6% resulting in more than \$56 million of value added to the fund this fiscal year versus the policy portfolio.

MOSERS welcomed three new Board trustees during fiscal year 2023. During my tenure as Board chairwoman, I have witnessed the substantial amount of time and service our trustees have dedicated to MOSERS. I am proud to lead this fine group of fiduciaries in acting in the best interest of our members. As a state employee elected to the MOSERS Board by our active membership, I understand the value of a future MOSERS pension benefit and the role this benefit has in the employers' recruitment and retention efforts. Total compensation is more than just the dollars received in a paycheck. The ongoing monthly contributions from the MOSERS-covered employers represent a significant financial commitment to our members, their families, their communities, and ultimately the citizens we serve. As we look to fiscal year 2024, the Board in conjunction with staff, will continue to further our core mission of advancing the financial security of our members.

I wish to express my appreciation to you, our members, for your commitment and service to this great state and its citizens. I am honored to serve as one of your representatives on the MOSERS Board.

If you ever have any questions, please contact us at MOSERS, P.O. Box 209, Jefferson City, MO 65102, call us at (800) 827-1063, or visit our website at www.mosers.org.

Sincerely,

Crystal Wessing, Chairwoman
Board of Trustees

Board of Trustees



Crystal Wessing – Chairwoman
Elected Active Member



Jenny Jacobs, CPA – Vice Chairwoman
Elected Active Member

Senator Rusty Black
Senate Appointed Member

Gary Findlay
Elected Retired Member

Treasurer Vivek Malek
Ex-Officio Member



Gary Metzger
Governor Appointed Member



Joe Keifer
Governor Appointed Member



Senator John Rizzo
Senate Appointed Member

Commissioner Ken Zellers
Office of Administration
Ex-Officio Member

Representative Dirk Deaton
House Appointed Member

Representative Don Mayhew
House Appointed Member



Administrative Organization



Abby Spieler, JD

Executive Director

- TJ Carlson, MBA, CAIA, CTP
Chief Investment Officer
- Cindy Dixon, MPA
Chief Operating Officer
- Rochelle Reeves, JD
General Counsel
- Cindy Rehmeier, CFP
Manager, Defined Contribution Plans
- Nicki Russell, CPA, CIA, MPA
Chief Auditor
- Lisa Verslues, PHR, SHRM-CP
Human Resources Officer



Cindy Dixon, MPA

Chief Operating Officer

- Andrea Binkley, CGBA
Chief Benefits Officer
- Paul Moyer
Chief Technology Officer
- Jamie Mullen
Employer Services Manager
- Jeremy Pond, CPA, CFE, CGFM
Chief Financial Officer
- Candy Smith, MPA
Chief Communications Officer



TJ Carlson, MBA, CAIA, CTP

Chief Investment Officer

- Scott Hankins, CFA
Managing Director – Investment Risk & Operations
- Tyson Rehfeld, CFA
Deputy Chief Investment Officer

About MOSERS



Purpose

MOSERS was established September 1, 1957, and is governed by laws of the state of Missouri.

MOSERS administers retirement, survivor, life insurance, and long-term disability benefits, as well as deferred compensation plan management to its members.

MOSERS administers benefits for most state employees, including general state employees, employees of 10 regional colleges and universities, members of the Missouri General Assembly, statewide elected officials, judges, administrative judges, and legal advisors. MOSERS is responsible for administering benefits as set forth in state law and bears a fiduciary obligation to the state employees who are its members.

Administration

State law provides that responsibility for the administration of MOSERS is vested in an 11-member Board of Trustees. The Board is comprised of the following:

- two members of the Senate appointed by the President Pro Tem of the Senate;
- two members of the House of Representatives appointed by the Speaker of the House;
- two members appointed by the Governor;
- the State Treasurer;
- the Commissioner of Administration; and
- three System members: two active members elected by the active and inactive-vested members, and one retiree elected by the retired members.

Introductory Section

The day-to-day management of MOSERS is delegated to the executive director who is appointed by the Board. The executive director acts as advisor to the Board on all matters pertaining to the System, and employs the remaining staff needed to manage the System.

Organization

The executive director, chief operating officer, and chief investment officer are responsible for planning, organizing, and administering the operations of the System under the broad policy guidance and direction of the Board.

Executive

The executive staff provide administrative support by assisting the executive director in the major legal, financial, operational, and oversight functions. Human resources, which includes oversight of general building maintenance, is also represented in this section. Responsible for business continuity preparation and planning, this section also coordinates activities and processes for the organization that facilitate strategic thinking, planning, and implementation.

Accounting

The staff in this section are responsible for all financial records of the programs administered by MOSERS, including the preparation of financial and statistical reports and purchasing functions for MOSERS. This team works with the investment custodian, internal investment managers, Office of Administration accounting team, state of Missouri, actuaries, banks, and the IRS.

Benefits Administration

Staff in the benefits administration section are responsible for all member data, benefit verifications and inception, as well as contact with members regarding the benefit programs administered by MOSERS (retirement, life insurance, and long-term disability insurance).

Communications and Education

Communications and education staff are responsible for presenting information in clear and concise ways to facilitate effective, well-informed decision-making, planning, and action. They produce materials for members regarding the benefits administered by MOSERS including publications such as newsletters, handbooks, forms, and brochures. This team works in conjunction with information technology staff on electronic materials and tools such as the public, Board, secure member and internal websites, social media, and member emails. This team also conducts educational seminars in multiple cities around the state each year and hosts webinars to inform members about their MOSERS benefits.

Employer Services

Staff in the employer services section facilitate the collection of member and employer contributions, maintain member benefit eligibility records, and provide technical assistance and general education to employer representatives regarding the timely and accurate submission of payroll and benefit eligibility data.

Information Technology

Staff in this section provides computer and technical design support for MOSERS' administrative activities. This team is responsible for developing and maintaining the automated systems used to administer benefits. They are also responsible for the document imaging system, network and data security, unified communication system, and personal computers.

Internal Audit

Internal audit staff are responsible for identifying and managing MOSERS' risks and ensuring policies, procedures, and controls are in place and working effectively. They improve MOSERS' operations by strengthening the organization and protecting stakeholders.

Investments

The investments staff oversees and implements MOSERS' investment program. Primary functions include managing assets internally, selecting external managers for portions of the portfolio, researching and implementing portfolio allocation shifts and rebalancing, providing technical advice, serving as a liaison to the investment community, and informing and advising the Board and executive director on financial, economic, and political developments which may affect the System. This team works closely with external investment consultants, legal counsel, and the executive director.

Outside Professional Services

Actuary

- Cavanaugh Macdonald Consulting, LLC

Auditor

- Eide Bailly, LLP

Governmental Consultant

- Gamble & Schlemeier, Ltd.

Legal Counsel

- Ice Miller, LLP
- Thompson Coburn, LLP

Information Technology Consultants

- Avtex
- Huber & Associates

Pension System Administration Consultants

- ICON Integration and Design, Inc.
- Linea Solutions
- Tegrity

Risk Management Consultant

- Charlesworth & Associates, LLC

Third-Party Administrators

- MissionSquare Retirement
Deferred Compensation Plan
- The Standard Insurance Company
Life Insurance & Long-Term Disability Insurance
- TIAA
Colleges & Universities Retirement Plan

Investment Management Consultants

- Blackstone Alternative Asset Management, LP
Specialty Consultant - Hedge Funds
- Meketa Investment Group
Specialty Consultant - Public Markets
- NEPC, LLC
Specialty Consultant - Private Markets
- Verus Advisory, Inc.
Board Investment Consultant

Master Custodian

- Bank of New York Mellon

Business Bank

- Central Bank

The Schedule of Fees and Commissions can be found on page 72. Investment management, custodial and consulting fees can be found in the Schedule of Investment Expenses on pages 60-61. Additional information on investment managers can also be found in the Investment Section of this report.



FINANCIAL SECTION

Committed to providing valuable benefits intended to improve the quality of life and assist members in the pursuit of financial security.



Independent Auditor's Report

To the Board of Trustees
Missouri State Employees' Retirement System
Jefferson City, Missouri

Report on the Audit of the Financial Statements

Opinions

We have audited the financial statements of pension funds and custodial fund, collectively the aggregate fiduciary funds of the Missouri State Employees' Retirement System (MOSERS), a pension (and other employee benefit) trust fund of the State of Missouri, as of and for the year ended June 30, 2022, and the related notes to the financial statements, which collectively comprise MOSERS's basic financial statements as listed in the table of contents.

In our opinion, the accompanying financial statements referred to above present fairly, in all material respects, the respective fiduciary net position of the pension funds and custodial fund, collectively the aggregate fiduciary funds of MOSERS, as of June 30, 2023, and the respective changes in fiduciary net position for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America (GAAS) and the standards applicable to financial audits contained in *Government Auditing Standards (Government Auditing Standards)*, issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditor's Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of MOSERS and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting principles generally accepted in the United States of America; and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

What inspires you, inspires us. | eidebailly.com

877 W. Main St., Ste. 800 | Boise, ID 83702-5858 | T 208.344.7150 | F 208.344.7435 | EOE

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinions. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of MOSERS' internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis and required supplementary information on pages 20-23 and 52-59 be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with GAAS, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise the MOSERS' basic financial statements. The additional supplementary information accompanying financial information listed as additional supplemental schedules in the table of contents are presented for purposes of additional analysis and are not a required part of the basic financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the additional supplementary information accompanying financial information listed as additional supplemental schedules in the table of contents are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

Other Information

Management is responsible for the other information included in the annual report. The other information comprises the introductory, investment, actuarial, and statistical sections but does not include the basic financial statements and our auditor's report thereon. Our opinion on the basic financial statements does not cover the other information, and we do not express an opinion or any form of assurance thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and consider whether a material inconsistency exists between the other information and the basic financial statements, or the other information otherwise appears to be materially misstated. If, based on the work performed, we conclude that an uncorrected material misstatement of the other information exists, we are required to describe it in our report.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated November 13, 2023, on our consideration of the MOSERS' internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of MOSERS' internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering MOSERS' internal control over financial reporting and compliance.



Boise, Idaho

November 13, 2023

Management's Discussion and Analysis

This discussion and analysis of the Missouri State Employees' Retirement System (MOSERS) provides an overview of the retirement system's financial activities for the fiscal year ended June 30, 2023. It is intended to be used in conjunction with the *Transmittal Letter* beginning on page 6 and *Basic Financial Statements and Notes to the Basic Financial Statements*, beginning on page 24 of this report.

Using This Financial Report

This *Annual Comprehensive Financial Report* (ACFR) reflects the activities of MOSERS as reported in the *Statements of Fiduciary Net Position* and the *Statements of Changes in Fiduciary Net Position*, which begin on page 24. These statements are prepared in conformity with generally accepted accounting principles. The *Notes to the Basic Financial Statements* are an integral part of the financial statements and include additional information not readily evident in the statements themselves. The *Required Supplementary Information* (RSI) and *Additional Financial Information* following the *Notes to the Basic Financial Statements* provide historical information and additional details considered useful in evaluating the condition of the plan.

See the *Actuarial Section* of this report for a detailed discussion of the actuarial value of assets and liabilities and the funded status of the plans.

The *Basic Financial Statements* contained in this section of the ACFR consist of:

- The *Statements of Fiduciary Net Position* report the fiduciary funds' assets, deferred outflows, liabilities, deferred inflows, and resulting net position, where total assets plus deferred outflows less current liabilities and deferred inflows equal net position held in trust for future pension benefits available at the end of the fiscal year. It is a snapshot of the financial position of the fiduciary funds at that specific point in time.
- The *Statements of Changes in Fiduciary Net Position* summarize the fiduciary funds' financial transactions that have occurred during the fiscal year where additions less deductions equal the change in net position. It supports the change that has occurred to the prior year's net position on the *Statements of Fiduciary Net Position*.
- The *Notes to the Basic Financial Statements* are an integral part of the above financial statements and include additional information not readily evident in the statements themselves.

Funding Analysis

Funded status is presented using two different valuation methods within this document for two different purposes. One valuation method is for the purpose of determining contribution rates, and the other method is required by Governmental Accounting Standards Board (GASB) Statement 67 to provide information about the net pension liability as of a specific point in time using the market value of investment assets. The valuation method used for determining contribution rates smooths investment activity over a period of five years to minimize the impact investment market volatility can have on contribution rates.

Funding Methodology for Determining Contribution Rates

The unfunded actuarial accrued liability (UAAL) for the Missouri State Employees' Plan (MSEP) increased by \$0.345 billion from \$6.515 billion at June 30, 2022, to \$6.860 billion at June 30, 2023, with a corresponding decrease in funded percentage from 57.7% to 57.6%. The primary driver for the increase in the UAAL was an actuarial loss on liability experience due to inflationary increases in covered payroll causing the projection of future benefit payments to increase. Although increases in covered payroll increase the UAAL, it has a less significant effect on the contribution rate because the larger covered payroll base naturally results in more retirement contributions flowing into the system.

The UAAL for the Judicial Plan increased by \$21 million from \$426 million at June 30, 2022, to \$447 million at June 30, 2023, with a decrease in funded percentage from 32.4% to 31.7%.

The assumed rate of investment return was 6.95% for both the MSEP and the Judicial Plan.

Financial Reporting Methodology required by GASB Statement 67

The fund net position as a percentage of total pension liability decreased from 53.5% at June 30, 2022, to 52.9% at June 30, 2023, for the MSEP Fund, and decreased from 30.2% to 29.1% for the Judicial Plan Fund. See the *Required Supplementary Information* section of this report for more information about net pension liability and related information.

Financial Reporting Highlights

The *Summary Comparative Statements of Fiduciary Net Position*, and the *Summary Comparative Statements of Changes in Fiduciary Net Position* presented below are designed to provide the reader of this report with a high level overview of MOSERS' financial activity and net position.

Summary Comparative Statements of Fiduciary Net Position

	As of June 30, 2023	As of June 30, 2022	Amount of Change	Percentage Change
Assets				
Administrative operating cash and equivalents	\$ 14,176,248	\$ 14,957,215	\$ (780,967)	(5.22%)
Receivables	801,745,263	977,028,152	(175,282,889)	(17.94)
Investments	12,207,445,578	12,239,716,310	(32,270,732)	(0.26)
Capital assets, net of accumulated depreciation	15,148,833	14,237,807	911,026	6.40
Total assets	13,038,515,922	13,245,939,484	(207,423,562)	(1.57)
Deferred outflow of resources	1,078,184	770,232	307,952	39.98
Liabilities				
Administrative and other payables	16,049,335	15,864,368	184,967	1.17
Investment related payables and obligations	4,263,787,195	4,780,687,176	(516,899,981)	(10.81)
MOSERS investment portfolio liability (MIP)	3,632,433	3,539,587	92,846	2.62
Net OPEB liability	5,635,287	6,413,236	(777,949)	(12.13)
Total liabilities	4,289,104,250	4,806,504,367	(517,400,117)	(10.76)
Deferred inflow of resources	2,256,993	1,216,203	1,040,790	85.58
Net position restricted for fiduciary activities	\$ 8,748,232,863	\$ 8,438,989,146	\$ 309,243,717	3.66

The largest components of the net position of the pension trust funds are investments, and investment related receivables and liabilities. The majority of MOSERS' receivable balances are comprised of investment related transactions, such as pending trade settlements, and interest and dividends receivable. Investment related liabilities include payables for investments purchased, manager fees payable, and obligations under repurchase agreements. MOSERS investment portfolio liability (MIP) represents the amount Missouri Deferred Compensation Plan participants have invested in MOSERS' portfolio.

The value of the investment portfolio, which includes investments, and investment related receivable and liability balances, did not change significantly this year. The markets were volatile during the fiscal year due to uncertainty about the future of interest rates, inflation and economic growth. MOSERS experienced a 2.53% time-weighted return on plan assets. In addition, the state of Missouri made an additional contribution of \$500 million to the MSEP during the beginning of the fiscal year which allowed for positive net position growth for the MSEP fund. MOSERS, like other mature pension plans, relies in part on cash flow generated from investments, to fund benefit payments.

Another noteworthy change in MOSERS' *Statement of Fiduciary Net Position* is the increase in capital assets related to the continued development of our new pension administration system. MOSERS capitalized approximately \$1.0 million in project costs incurred during the year. When the new pension administration system is implemented, these capitalized software development project costs will be amortized over the estimated useful life of the system. The project timeline has been extended to allow more time to test the system prior to deployment, and the project is now expected to be completed in 2024.

Summary Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2023	Year Ended June 30, 2022	Amount of Change	Percentage Change
Additions				
Contributions	\$ 1,206,881,008	\$ 587,430,121	\$ 619,450,887	105.45%
Net investment income (loss)	181,851,788	(835,205,231)	1,017,057,019	(121.77)
Miscellaneous income	480,766	485,972	(5,206)	(1.07)
Total additions	1,389,213,562	(247,289,138)	1,636,502,700	(661.78)
Deductions				
Benefit payments	1,024,251,130	992,014,868	32,236,262	3.25
Premium disbursements	31,737,102	29,896,004	1,841,098	6.16
Service transfers and refunds	12,425,868	13,134,944	(709,076)	(5.40)
Administrative expenses	11,555,745	9,808,530	1,747,215	17.81
Total deductions	1,079,969,845	1,044,854,346	35,115,499	3.36
Net increase (decrease)	309,243,717	(1,292,143,484)	1,601,387,201	(123.93)
Net position beginning of year	8,438,989,146	9,731,132,630	(1,292,143,484)	(13.28)
Net positions restricted for fiduciary activities	<u>\$ 8,748,232,863</u>	<u>\$ 8,438,989,146</u>	<u>\$ 309,243,717</u>	3.66

Investment Results

MOSERS' total fund net position increased by \$0.3 billion, to end at \$8.7 billion in fiscal year 2023. Net position increased slightly from last year, driven primarily by a \$500 million ad hoc contribution from the state of Missouri. The fund returned a time-weighted return of 2.53% in fiscal year 2023 compared to (9.02)% in fiscal year 2022.

In an effort to bring inflation under control, the Federal Reserve has continued to steadily increase interest rates. There have been mixed economic signals in the market place during the year creating uncertainty about the near-term future of the economy. This uncertainty in the investment environment and shift to higher interest rates has generally resulted in mixed results in many asset classes this year. Growth assets experienced positive returns but fixed income assets produced negative returns. As further discussed in the *Investment Section* of this report, we continue to recognize the importance of diversifying our investment assets to contribute to our long-term success.

It is also important to note that investment gains and losses are actuarially smoothed over a 5-year period to prevent market volatility from causing significant year-to-year changes in the contribution rate.

The *Investment Section* of this report contains additional information regarding investments activity.

Contribution Revenue

MOSERS received a \$500 million one-time additional contribution from the state of Missouri during fiscal year 2023. This one-time contribution accounts for most of the year-over-year percent increase in contributions revenue.

Excluding the \$500 million additional contribution by the state of Missouri, contribution revenue increased by 20.3% from the prior year. This increase in contribution revenue is primarily due to two factors: the contribution rate increased, and the covered payroll of active benefit-eligible employees increased. The contribution rate is set in advance; however, unexpected changes in covered payroll can cause contribution revenue to come in above or below expectation.

The employer retirement contribution rates for the MSEP members is the primary driver for total fund contributions revenue. This rate increased from 23.51% in fiscal year 2022 to 26.33% in fiscal year 2023. The employee contribution rates for 2011 tier members is set by statute at 4% of gross pay. The percent of MSEP 2011 tier members who contribute 4% continues to grow every year to make up a larger percentage of our overall membership base. As of June 30, 2023, 62% of the active membership population were MSEP 2011 members.

Covered payroll is the other primary factor that ultimately determines our contribution revenue. There was a significant increase in covered payroll during the fiscal year. The active MSEP membership base increased this year by 3.6%, reversing a multi-year trend of decreases. Active MSEP member covered payroll increased this year by almost 13%. These increases were greater than our actuarial assumptions.

Judicial Plan contributions and Insurance fund premium contributions each account for less than 10% of total fund contributions revenues. Covered payroll for judges increased 2.1% over last year based on the actuarial valuation report. Contributions were slightly higher than last year because, although the fiscal year 2023 contribution rate was lower than the fiscal year 2022 rate, covered payroll increased. In addition, the active membership population was comprised of 73% of Judicial Plan 2011 tier members, compared to 63% last year. Insurance fund premium contributions were also higher than the prior year.

The *Actuarial Section* of this report contains more information about our actuarial assumptions and experience.

Benefits Expenses

Benefit payment expenses were 3.25% greater than the prior year due to a growing retiree population and cost-of-living adjustments (COLAs).

The population of retirees receiving benefits continued to grow during the fiscal year. A growing retiree population puts upward pressure on the contribution rate. Schedules of retirees added and removed from the benefit rolls can be viewed on pages 103-104 of the *Actuarial Section* of this report.

COLAs provided to existing benefit recipients also cause benefit expenses to increase each year. Members employed before August 28, 1997, who retired under the MSEP, receive a COLA of at least 4% each year (maximum 5%) until they reach their COLA cap. For general state employees, COLAs are based on 80% of the percentage increase in the average Consumer Price Index (CPI) from one year to the next. The maximum increase is 5% (minimum 0%). The cost-of-living adjustment for fiscal year 2023 was 5%.

Administrative Expenses

Administrative expenses totaled \$11.6 million in fiscal year 2023, compared to \$9.8 million in fiscal year 2022. MOSERS experienced an increase in administrative expense due mainly to increases in personal services and fringe benefits.

Requests for Information

This financial report is designed to provide a general overview of the System's finances for all those who are interested. Questions concerning any of the information provided in this report or requests for additional information should be addressed to MOSERS at P.O. Box 209, Jefferson City, MO 65102 or by email at FOLArequest@mosers.org.

Statements of Fiduciary Net Position

As of June 30, 2023

	MSEP Pension Fund	Judicial Pension Fund	Insurance Custodial Fund	Total
Assets				
Administrative operating cash and cash equivalents	\$ 10,855,339	\$ 28	\$ 3,320,881	\$ 14,176,248
Receivables				
Contributions and premiums	24,945,897	3,417,363	968,849	29,332,109
Investment income	568,066,057	12,513,180	0	580,579,237
Investment sales	187,635,066	4,128,682	0	191,763,748
Other receivables	70,169	0	0	70,169
Total receivables	780,717,189	20,059,225	968,849	801,745,263
Investments and derivatives				
Investments - cash and cash equivalents	1,731,235,920	38,112,082	0	1,769,348,002
Investments - treasuries	4,217,530,799	92,836,642	0	4,310,367,441
Investments - fixed income	214,747,999	4,722,641	0	219,470,640
Investments - equities	331,462,851	7,302,456	0	338,765,307
Investments - real estate investment trusts	431,782,070	9,502,191	0	441,284,261
Investments - equity and fixed income commingled funds	1,057,900,792	23,290,053	0	1,081,190,845
Investments - alternatives and limited partnerships	3,953,669,099	87,041,395	0	4,040,710,494
Investments - derivative instruments	6,172,813	135,775	0	6,308,588
Total investments and derivatives	11,944,502,343	262,943,235	0	12,207,445,578
Capital assets, net of accumulated depreciation	15,148,833	0	0	15,148,833
Total assets	12,751,223,704	283,002,488	4,289,730	13,038,515,922
Deferred outflow of resources	1,054,867	23,317	0	1,078,184
Liabilities				
Administrative and benefit expense payables	10,574,603	682,939	4,076,870	15,334,412
Employee vacation and overtime liability	699,462	15,461	0	714,923
Payable for investments purchased	75,514,534	1,661,800	0	77,176,334
Management fees payable	1,142,335	24,824	0	1,167,159
Investment activities payable	568,988,340	12,535,324	0	581,523,664
Obligations under repurchase agreements	3,526,290,255	77,629,783	0	3,603,920,038
MOSERS investment portfolio liability (MIP)	3,554,193	78,240	0	3,632,433
Net OPEB liability	5,513,418	121,869	0	5,635,287
Total liabilities	4,192,277,140	92,750,240	4,076,870	4,289,104,250
Deferred inflow of resources	2,208,183	48,810	0	2,256,993
Net position restricted for pension activities	8,557,793,248	190,226,755	0	8,748,020,003
Net position restricted for custodial activities	0	0	212,860	212,860
Net position restricted for fiduciary activities	\$ 8,557,793,248	\$ 190,226,755	\$ 212,860	\$ 8,748,232,863

See accompanying *Notes to the Basic Financial Statements*.

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2023

	MSEP Pension Fund	Judicial Pension Fund	Insurance Custodial Fund	Total
Additions				
<i>Contributions and premiums</i>				
Employer contributions and premiums	\$ 582,381,146	\$ 39,064,758	\$ 14,443,413	\$ 635,889,317
Additional state contribution	500,000,000	0	0	500,000,000
Employee contributions and premiums	48,487,731	1,746,913	17,312,120	67,546,764
Member purchases of service credit	1,591,102	0	0	1,591,102
Service transfer contributions	3,573,592	0	0	3,573,592
Prepaid employer contributions discount	(1,719,767)	0	0	(1,719,767)
Total contributions and premiums	1,134,313,804	40,811,671	31,755,533	1,206,881,008
<i>Investment activity</i>				
Investing activity income:				
Net appreciation in fair value of investments	479,770,983	10,734,914	0	490,505,897
Interest	86,907,078	1,910,074	87,335	88,904,487
Dividends	21,930,229	483,874	0	22,414,103
Other	320,748	7,141	0	327,889
Total investing activity income	588,929,038	13,136,003	87,335	602,152,376
Investing activity expenses:				
Management and incentives fees	129,285,045	2,855,114	0	132,140,159
Custody and other fees	608,585	13,460	0	622,045
Consultant fees	858,652	18,881	0	877,533
Internal investment activity expenses	6,339,930	57,485	0	6,397,415
Total investing activity expenses	137,092,212	2,944,940	0	140,037,152
Reverse repurchase agreement activity:				
Loss on assets in reverse repurchase agreements	(144,334,848)	(3,156,494)	0	(147,491,342)
Interest expense from reverse repurchase agreements	(129,903,188)	(2,868,906)	0	(132,772,094)
Total net loss from reverse repurchase agreement activity	(274,238,036)	(6,025,400)	0	(280,263,436)
Total net investment income	177,598,790	4,165,663	87,335	181,851,788
Miscellaneous income	646	0	480,120	480,766
Total additions	1,311,913,240	44,977,334	32,322,988	1,389,213,562
Deductions				
Benefit payments	917,235,787	45,108,589	0	962,344,376
Premium disbursements	0	0	31,737,102	31,737,102
BackDROP payments	61,834,625	0	0	61,834,625
Buyout and lump-sum payments	72,129	0	0	72,129
Service transfer payments	4,426,152	0	0	4,426,152
Contribution and premium refunds	7,981,346	0	18,370	7,999,716
Administrative expenses	10,984,550	91,076	480,119	11,555,745
Total deductions	1,002,534,589	45,199,665	32,235,591	1,079,969,845
Net increase (decrease) in net position	309,378,651	(222,331)	87,397	309,243,717
Net position restricted for fiduciary activities:				
Beginning of year	8,248,414,597	190,449,086	125,463	8,438,989,146
End of year	\$ 8,557,793,248	\$ 190,226,755	\$ 212,860	\$ 8,748,232,863

See accompanying *Notes to the Basic Financial Statements*.

Notes to the Basic Financial Statements

Note 1 – Plan Descriptions and Contribution Information

The MSEP and the Judicial Plan are pension plans covering substantially all state of Missouri employees and judges.

Missouri State Employees' Plan (MSEP)

The MSEP is a cost-sharing multiple-employer, defined benefit public employee retirement plan with two benefit structures known as the MSEP (closed plan) and MSEP 2000 (which includes the MSEP 2011 tier), which are administered by the Missouri State Employees' Retirement System (MOSERS) in accordance with Sections 104.010 and 104.312 to 104.1215 of the Revised Statutes of Missouri (RSMo). As established under Section 104.320, RSMo, MOSERS is a body corporate and an instrumentality of the state. The System is vested with the powers and duties specified in Sections 104.010 and 104.312 to 104.1215, RSMo, and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes of Sections 104.010 and 104.312 to 104.1215, RSMo.

Responsibility for the operation and administration of the System is vested in the 11-member MOSERS Board of Trustees (the Board) as defined by state law. Due to the nature of MOSERS' reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the MSEP is considered a pension trust fund of the state of Missouri, and is included in the state's financial reports as a pension trust fund.

The Board intends to follow a financing pattern that computes and requires contribution amounts which, expressed as a percent of active member payroll, will remain approximately level from year to year and from one generation of citizens to the next. For the year ended June 30, 2023, the employer contribution rate was 26.33% of covered payroll.

Complete recognition of the year-to-year swings in the fair value of System assets would produce contribution rate changes that would run counter to the "approximately level" goal. A common actuarial practice, referred to as asset smoothing, is used to address that issue. Recognizing the difference between the actual and assumed investment returns over a closed, five-year period helps ensure a more stable contribution rate.

At any point in time, the actuarial value of assets will be more or less than the fair value but, if the smoothing method is prudent and properly constructed, those values will converge over time. As of June 30, 2023, the ratio of actuarial value of assets to fair value of assets was 109.04%, for the MSEP.

Per the June 30, 2023, actuarial valuation, membership in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		54,709
Active		
Vested	25,223	
Nonvested	17,865	43,088
Inactive		
Vested (not yet receiving benefits)*	18,305	
Nonvested (with contribution balances)	31,575	49,880
Total membership		147,677

** Includes 106 members on leave of absence and 548 members on long-term disability*

Generally, all full-time state employees, employed before July 2000, who became vested and were not covered under another state-sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees who were employed after July 1, 2000, but before January 1, 2011, are members of the MSEP 2000.

Those first employed in a benefit-eligible position on or after January 1, 2011, are members of the MSEP 2011 tier of the MSEP 2000.

MOSERS participates as an employer in the MSEP and MSEP 2000, including the MSEP 2011 tier.

Unless otherwise delineated, data for the MSEP is inclusive of members in the MSEP 2000 and MSEP 2011, which all provide defined benefit pension, survivor, life insurance, and long-term disability benefits.

Employer contributions for the MSEP are determined through annual actuarial valuations. The required contributions are expressed as a percentage of covered payroll. The state of Missouri and its component employers make required contributions to the plans. Employer contributions for the fiscal year ended June 30, 2023, were 26.33% of covered payroll. Members of MSEP and MSEP 2000 do not make employee contributions. Members of MSEP 2011 tier are required to contribute 4% of covered payroll.

Final average pay (FAP), is the average pay of a member for the 36 full, consecutive months of service before termination of employment when the member's pay was greatest. If the member was on workers compensation leave of absence or medical leave of absence due to an employee illness, or on long-term disability, FAP is the amount of pay the member would have received, but for such leave of absence as reported and verified by the employing department. If the member was employed for less than 36 months, FAP is the average monthly pay of a member during the period for which the member was employed.

For a summary of benefits for general state employees, legislators, and statewide elected officials under the MSEP, MSEP 2000, and MSEP 2011 tier, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

MSEP (closed plan)

General state employees are fully vested for benefits upon accruing five years of credited service. Under the MSEP, general employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 5 years of service; or
- Age 60 with 15 years of service; or
- Age 48 with age and service equaling 80 or more – “Rule of 80.”

General employees may retire early at age 55 with at least 10 years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.6% multiplied by the final average pay multiplied by years of credited service.

Members employed prior to August 28, 1997, receive cost-of-living adjustments (COLAs) annually based on 80% of the percentage increase in the average consumer price index (CPI) from one year to the next, with a minimum rate of 4% and maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, members must have left state employment on or after October 1, 1984, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and meet age requirements. In addition, if members left state employment on or after August 28, 1997, and prior to September 1, 2002, the present value of their benefit must be less than \$10,000.

MSEP 2000

General state employees are fully vested for benefits upon accruing five years of credited service. Under the MSEP 2000, general employees may retire with full benefits upon the earliest of attaining:

- Age 62 with 5 years of service; or
- Age 48 with age and service equaling 80 or more – “Rule of 80.”

General employees may retire early at age 57 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under the “Rule of 80” receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

MSEP 2011 Tier

On July 19, 2010, legislation was signed into law adding a new tier (MSEP 2011) to the MSEP 2000 defined benefit pension plan. This tier includes all members first employed in a benefit-eligible position on or after January 1, 2011.

Legislation signed into law on July 14, 2017, changed the original vesting requirement of 10 years to five years for actively employed members of the MSEP 2011, effective January 1, 2018.

Under the MSEP 2011, general employees may retire with full benefits upon the earliest of attaining:

- Age 67 with 5 years of service; or
- Age 55 with age and service equaling 90 or more – “Rule of 90.”

General employees may retire early at age 62 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under “Rule of 90” receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Judicial Plan

The Judicial Plan is a single-employer, defined benefit public employee retirement plan administered in accordance with Sections 476.445 to 476.690, RSMo. Responsibility for the operation and administration of the Judicial Plan is vested in the MOSERS Board of Trustees. Due to the nature of MOSERS’ reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the Judicial Plan is considered a pension trust fund of the state of Missouri financial reporting entity and is included in the state’s financial reports as a pension trust fund.

Judges and commissioners of the supreme court or the court of appeals, judges of any circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, commissioners or deputy commissioners of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government in a city not within a county, commissioners of the juvenile division of the circuit court appointed pursuant to Section 211.023, RSMo, commissioners of the drug court or commissioners of any family court are eligible for membership in the Judicial Plan. The Judicial Plan provides defined benefit pension and survivor benefits. Members are immediately vested.

Per the June 30, 2023, actuarial valuation, membership in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		619
Active		
Vested	415	
Nonvested	0	415
Inactive		
Vested (not yet receiving benefits)		32
Total membership		1,066

Funding of the Judicial Plan on an actuarial basis began on July 1, 1998. Employer contributions are determined through annual actuarial valuations. For the year ended June 30, 2023, the employer contribution rate was 60.17% of covered payroll. The state of Missouri makes the employer contribution to the Judicial Plan. Members of the Judicial Plan (closed plan) do not make employee contributions. Members of the Judicial Plan 2011 tier are required to contribute 4% of covered payroll.

Judicial Plan (closed plan)

Members of the Judicial Plan may retire with full benefits upon the earliest of attaining:

- Age 62 with 12 years of service; or
- Age 60 with 15 years of service; or
- Age 55 with 20 years of service.

Employees may retire early at age 62 with less than 12 years of service, or age 60 with less than 15 years of service with a reduced benefit that is based upon years of service relative to 12 or 15 years.

In the Judicial Plan, the base benefit for members with 12 or more years of service is equivalent to 50% of compensation on the highest court served.

Members first employed prior to August 28, 1997, receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, with a minimum rate of 4% and a maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members first employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, they must have left state employment on or after August 28, 1997, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and have a benefit present value of less than \$10,000.

Judicial Plan 2011 Tier

On July 19, 2010, an additional tier of the defined benefit Judicial Plan was signed into law. This tier (Judicial Plan 2011) includes all new judicial members first employed as a judge on or after January 1, 2011.

Under the Judicial Plan 2011, members may retire with full benefits upon the earliest of attaining:

- Age 67 with 12 years of service; or
- Age 62 with 20 years of service.

Judicial Plan 2011 members may retire early at age 67 with less than 12 years of service with reduced benefits, or age 62 with less than 20 years of service with a reduced benefit based on years of service.

For a more detailed summary of benefits for members of the Judicial Plan, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

Administrative Law Judges and Legal Advisors' Plan

On April 26, 2005, Senate Bill 202 was enacted, which terminated the Administrative Law Judges and Legal Advisors' Plan (ALJLAP) for new hires only. Under this legislation, administrative law judges and legal advisors (ALJs) who assume a position after April 26, 2005, who would have otherwise been covered by the ALJLAP, will instead participate in the MSEP or the MSEP 2000, depending on when they initially became state employees. For fiscal years 2005 and after, all liabilities and assets of the ALJLAP were transferred and combined with the MSEP. Membership totals for the ALJLAP are included in the MSEP in all relevant sections of this report.

Missouri State Insured Defined Benefit Insurance Plan

The Missouri State Insured Defined Benefit Insurance Plan is administered through, and underwritten by, The Standard Insurance Company (The Standard), which is a third-party administrator with oversight by MOSERS. It provides basic life insurance in an amount equal to one times annual salary while actively employed (with a \$15,000 minimum) to eligible members of the MSEP, MSEP 2000, and MSEP 2011 (except employees of the Missouri Department of Conservation and certain state universities), Judicial Plan, Judicial Plan 2011, and certain members of the Public School Retirement System (PSRS).

The plan also provides duty-related death benefits, optional life insurance for active employees and retirees who are eligible for basic coverage, and a long-term disability insurance plan for eligible members. For a more detailed description of insurance benefits, refer to pages 117-118 in the *Actuarial Section* of this report.

Due to the nature of MOSERS' reliance on funding from the state of Missouri and its component employers, and the overall control of the plan document by the legislative and executive branches of state government, the Missouri State Insured Defined Benefit Insurance Plan is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports.

State of Missouri Deferred Compensation Plan (MO Deferred Comp)

MO Deferred Comp is a retirement savings plan for state of Missouri employees, including faculty and staff at 10 state colleges and universities. Money invested in the plan provides income in retirement to supplement the member's defined benefit pension and Social Security benefits. Funds are automatically deducted from the employee's pay and placed in their account. The participant decides how the money will be invested. Employees may also roll over eligible pre-tax distributions from other qualified retirement plans.

The MO Deferred Comp plan is comprised of a 457 deferred compensation plan for employee contributions and a related 401(a) plan for an employer incentive match contribution. MOSERS uses MissionSquare Retirement as an external provider for record keeping for the plans. These plans have separately issued financial statements. The net position of these plans was approximately \$2.1 billion and \$636.9 million as of June 30, 2023, for the 457 and 401(a) plans, respectively.

MOSERS unitizes investments for the purpose of allowing participants in the State of Missouri Deferred Compensation Plan the option to invest in the MOSERS investment portfolio (MIP). For financial reporting purposes, investments throughout this ACFR are reported in whole and include 0.04%, or approximately \$3.6 million, of the units invested in the MIP by Deferred Compensation participants. Effective June 30, 2017, the option to invest in the MIP fund was no longer available to Plan participants. All participants invested in the MIP fund as of that date may continue to defer into it, but no rollovers or new elections are permitted.

Audited financial statements for the State of Missouri Deferred Compensation Plan can be viewed online at www.modeferrredcomp.org.

Colleges & Universities Retirement Plan (CURP)

The Colleges & Universities Retirement Plan (CURP) is a defined contribution plan administered by MOSERS for education employees (as determined by the university) at nine Missouri state universities. Retirement income from the plan is dependent upon the employee's plan account balance at retirement. The employee's plan account balance is built from mandatory contributions to the plan and the investment returns generated from employee-selected investment options. To be eligible for the CURP, the employee must:

- meet the definition of "education employee" as defined by their employer, and
- be employed in this position for the first time on or after July 1, 2002, and
- not have previous employment in a position covered by another defined benefit pension plan administered by MOSERS, and
- be employed at a participating regional Missouri university.

After six years of participation in CURP, the employee may transfer to a MOSERS defined benefit pension plan and will immediately become a vested member of MSEP 2011. By transferring to MOSERS, the employee forfeits all rights to future participation in CURP (i.e., they can't go back to CURP). However, the employee will continue to own and control their CURP account. CURP activities are not included within this report.

Note 2 – Summary of Significant Accounting Policies

Basis of Accounting

The accompanying financial statements are prepared in accordance with accounting principles generally accepted in the U.S. that apply to governmental accounting on an accrual basis.

Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits, refunds, and backDROP payments are recognized when due and payable. Administrative and other expenses are recorded when the corresponding liabilities are incurred.

Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the accompanying financial statements and disclosures. Actual results could differ from those estimates.

Method Used to Value Investments

Investment assets are reported at fair value, in accordance with Standards issued by the Governmental Accounting Standards Board (see Note 3 for discussion of the valuation methodology for investment assets). The *Schedule of Investments and Derivative Instruments Measured at Fair Value* in Note 3 presents the fair value information of the investments as reported on the *Statements of Fiduciary Net Position*.

MOSERS' Participation in Other Post-Employment Benefit (OPEB) Programs

Other Post-employment Benefit (OPEB) related items, including: Net OPEB liability, deferred outflows of resources, deferred inflows of resources, net OPEB expense, fiduciary net assets, additions to and deductions from fiduciary net assets have been determined on the same basis as they are reported by MCHCP. For this purpose, employer contributions are recognized as revenue when due and payable. Benefits are recognized when due and payable in accordance with the terms of the Plan (see *Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program*).

Capital & Intangible Assets

The MOSERS building and other capital assets are stated at cost less accumulated depreciation. Intangible assets include software applications and are stated at cost less accumulated amortization. Intangible assets are reported with capital assets in the *Statements of Changes in Fiduciary Net Position*. Capital and intangible assets are depreciated on a straight-line basis over their estimated useful lives. MOSERS evaluates leases and subscription-based information technology arrangements to determine if they should be capitalized as right-to-use assets. Right-to-use assets are depreciated on a straight-line basis over the non-cancellable life of the lease.

Note 3 – Cash and Investments

Cash Deposits with Financial Institutions

MOSERS requires its business bank to collateralize amounts on deposit that exceed the Federal Deposit Insurance Corporation (FDIC) insured amount. The types of collateral security shall be included on a list maintained by the State Treasurer's office in accordance with Section 30.270 RSMo. Securities pledged as collateral are held in agency by a separate bank. As of June 30, 2023, all deposit balances with MOSERS' business bank were fully collateralized.

Investment Policy

Section 104.440, RSMo allows the Board of Trustees to invest the trust fund assets in accordance with the prudent person rule. In June 2018, the Board voted to adopt a new asset allocation, which includes four broad categories: growth, income, inflation hedge, and absolute return.

MOSERS' policy, with respect to the allocation of invested assets, is established and amended by a majority vote by the Board of Trustees. The Board's guiding principles with respect to the investment of MOSERS' assets are to maximize total return within prudent risk parameters, and act in the exclusive interest of the members of the System. The Board has developed a policy allocation that is designed to achieve the long-term required return objectives of the System, given certain risk constraints. The current asset allocation reflects a diversified portfolio, which will perform well in a variety of economic conditions and will help reduce the portfolio's overall volatility.

The Board has authorized staff to create and maintain a portfolio that utilizes a modest amount of leverage in order to diversify the risk across the four asset class categories contained in the portfolio. The market exposure is limited to 1.5 times capital. The limit may also be stated as 150% of capital. The table below illustrates the fair value, market exposure, and policy exposure of the portfolio by asset class as of June 30, 2023.

Schedule of Internally Managed Leverage

	Fair Value Capital	Percent of Portfolio at Fair Value	Market Exposure	Percent of Portfolio at Market Exposure	Policy Exposure
Growth	\$ 3,952,118,840	45.3%	\$ 3,951,986,999	45.4%	45.0%
Income	1,538,840,923	17.7%	3,023,772,994	34.7	35.0
Inflation hedge	1,467,882,502	16.9%	3,516,474,491	40.4	40.0
Absolute return	1,750,789,042	20.1%	1,750,789,320	20.1	20.0
Total portfolio	\$ 8,709,631,307	100.0%	\$ 12,243,023,804	140.6%	140.0%

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate rates of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target asset allocation percentage and by adjusting for expected inflation, volatility, and correlations. Best estimates of the real rates of return for each major asset class included in MOSERS' target asset allocation as of June 30, 2023, are summarized in the table below.

Target Asset Allocation

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0%	7.7%	5.8%	2.3%
Global private equities	15.0	9.3	7.4	1.4
Long treasuries	25.0	3.5	1.6	0.9
Core bonds	10.0	3.1	1.2	0.3
Commodities	5.0	5.5	3.6	0.3
TIPS	25.0	2.7	0.8	0.7
Private real assets	5.0	7.1	5.2	0.3
Public real assets	5.0	7.7	5.8	0.4
Hedge funds	5.0	4.8	2.9	0.2
Alternative beta	10.0	5.3	3.4	0.5
Private credit	5.0	9.5	7.6	0.5
Cash and cash equivalents**	(40.0)	0.0	0.0	0.0
	100.0%			
Correlation/volatility adjustment				(0.6)
Long-term expected net nominal return				7.2
Less: investment inflation assumption				(1.9)
Long-term expected geometric net real return				5.3 %

* Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for the portfolio.

** Cash and cash equivalents policy allocation amounts are negative due to use of leverage.

Money-Weighted Rate of Return

The annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 2.13% for the year ended June 30, 2023. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

Fair Value Measurement

MOSERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (Level 1 measurements) and the lowest priority to unobservable inputs (Level 3 measurements).

- **Level 1** – Unadjusted quoted prices for identical instruments in active markets.
- **Level 2** – Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- **Level 3** – Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value (NAV) per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk.

In instances where inputs used to measure fair value fall into different levels in the fair value hierarchy, fair value measurements in their entirety are categorized based on the lowest level input that is significant to the valuation. MOSERS' assessment of the significance of particular inputs to these fair value measurements requires judgment and considers factors specific to each asset or liability. The tables on pages 35-36 show the fair value leveling of the investments and additional information for investments valued at net asset value.

Debt, equities, and investment derivatives classified in Level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities.

Debt securities classified in Level 2 have non-proprietary information that was readily available to market participants from multiple independent sources, which are known to be actively involved in the market. Pricing inputs may include market quotations, yields, maturities, call features, and ratings. Derivative securities classified in Level 2 are securities whose values are derived daily from associated traded securities.

Fair values for the private real estate investments are based on appraisals. Fair values of the limited partnership investments are based on valuations of the underlying companies of the limited partnerships as reported by the general partner. Certain limited partnerships reflect values and related performance on a quarter lag basis due to the nature of those investments and the time it takes to value them. Fair value of the commingled funds is determined based on the underlying asset values. The remaining assets are primarily valued by the System's master custodian using the last trade price information supplied by various pricing data vendors.

Investments and Derivative Instruments Measured at Fair Value

June 30, 2023	Total	Fair Value Measurement Using		
		Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investment by fair value level				
Treasuries				
U.S. government securities	\$ 4,310,367,441	\$ 4,310,367,441	\$ 0	\$ 0
Fixed income securities				
Corporate bonds and asset-backed securities	202,730,246	0	202,711,658	18,588
U.S. government agencies	324,007	0	324,007	0
Non-U.S. sovereign	14,800,163	0	14,800,163	0
Municipal bonds	1,616,224	0	1,616,224	0
Total fixed income securities	219,470,640	0	219,452,052	18,588
Equity				
Real estate investment trusts	441,284,261	441,284,261	0	0
Equity mutual funds	337,664,886	337,664,886	0	0
Other equity securities	1,100,421	1,039,457	0	60,964
Total equities	780,049,568	779,988,604	0	60,964
Total investment by fair value level	5,309,887,649	5,090,356,045	219,452,052	79,552
Investments measured at the NAV				
Commingled funds - equity funds	827,902,556			
Commingled funds - investment grade fixed income funds	253,288,289			
Commingled funds - short-term investment funds	25,654,000			
Hedge funds	2,615,757,920			
Private equity and timber funds	939,964,931			
Private real estate	484,987,643			
Total investments measured at the NAV	5,147,555,339			
Total investments measured at fair value	10,457,442,988	5,090,356,045	219,452,052	79,552
Investment derivative instruments				
Future contracts	3,555,767			
Credit default swap contracts	2,752,821			
Total investment derivative instruments	6,308,588			
Investments at cost or amortized cost:				
Cash held in investment accounts	748,694,002			
Repurchase agreements	995,000,000			
Total investments at cost or amortized cost	1,743,694,002			
Total investments	12,207,445,578	5,090,356,045	219,452,052	79,552
Obligations under repurchase agreements	(3,603,920,038)			
Total investments, net of obligations under repurchase agreements	\$ 8,603,525,540	\$ 5,090,356,045	\$ 219,452,052	\$ 79,552

Investments Measured at the Net Asset Value

	June 30, 2023	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled fund - equity funds	\$ 827,902,556		Daily, Monthly	1-10
Commingled fund - investment grade fixed income funds	253,288,289		Daily	2
Commingled fund - short-term investment fund	25,654,000		Daily	0
Active hedge funds				
Merger arbitrage	105,580,732		Monthly	45
Equity market neutral	172,703,442		Quarterly	90
Event driven	260,338,858		Semi-annually	60
Quantitative	173,078,419		Monthly, Quarterly	30-60
Multi strategy	714,540,528		Monthly, Quarterly	60-90
Fund-of-funds	1,184,890,528		Monthly, Quarterly	10-95
Pending liquidated hedge funds	4,625,413			
Private equity and timber funds	939,964,931	\$ 940,798,044		
Private real estate	484,987,643	15,229,402		
Total investments measured at the net asset value (NAV)	<u>\$ 5,147,555,339</u>	<u>\$ 956,027,446</u>		

- **Commingled fund - equity funds** – Five equity funds are considered to be commingled in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Commingled fund - investment grade fixed income funds** – Three fixed income funds are considered to be commingled in nature and are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Commingled fund - short term investment fund** – One short-term investment fund is considered to be commingled in nature and is valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Merger arbitrage hedge fund** – Consisting of one fund, this strategy invests in the common stock of companies that are involved in publicly announced mergers and seeks to generate attractive returns while dampening volatility. This investment is valued at the NAV, is redeemable monthly, and is not subject to lock-up restrictions.
- **Equity market neutral hedge fund** – Consisting of one fund, this strategy invests both long and short in U.S. and global equity securities, with the goal of having little to no net market exposure. This investment is valued at the NAV, is redeemable quarterly, and is not subject to lock-up restrictions.
- **Event driven hedge fund** – Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur in the onset or aftermath of a corporate action or related event. This investment is valued at the NAV, is redeemable semi-annually, and is not subject to lock-up restrictions.
- **Quantitative hedge funds** – Consisting of three funds, this strategy attempts to achieve uncorrelated returns using advanced statistical methods to select securities across liquid public markets and systematic volatility trading. These investments are valued at the NAV, are redeemable monthly or quarterly, and are not subject to lock-up restrictions.
- **Multi strategy hedge funds** – Consisting of five funds, these funds aim to pursue varying strategies in order to diversify risks and reduce volatility. These investments are valued at the NAV, are redeemable monthly or quarterly, but are subject to lock-up restrictions.
- **Fund-of-funds** – Consisting of four funds, these funds seek to provide diversification by holding a number of funds within a single fund structure. These investments are valued at the NAV, are redeemable monthly or quarterly, and are subject to liquidation of the underlying funds.

- **Pending liquidated hedge funds** – Consisting of eight funds which have been fully redeemed as of June 30, 2023, for which MOSERS is awaiting final distribution of the proceeds, which will be received upon sale of the underlying investments or upon completion of the audit of the firm’s annual financial statements.
- **Private equity, timber, and real estate funds** – MOSERS’ private equity portfolio consists of 43 funds with exposure to buyout funds, distressed funds, infrastructure, energy, secondary, royalty funds, and special situations. The real estate portfolio, comprised of 10 funds, invests mainly in U.S. commercial real estate. The timber portfolio consists of one fund in liquidation which invests in global timberland. The fair values of the majority of these funds have been determined using net assets valued one quarter in arrears plus current quarter cash flows. These funds are not eligible for redemption. Distributions are received as underlying investments when the funds are liquidated, which, on average, can occur over the span of five to 10 years.

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to MOSERS. As of June 30, 2023, MOSERS’ fixed income assets that are not U.S. government guaranteed represented 25.9% of fixed income securities. In preparing this report, credit risk associated with all fixed income holdings, including collateral for repurchase agreements, has been included. The tables on the following page summarize MOSERS’ fixed income security exposure levels and credit qualities.

As a matter of practice, there are no overarching limitations for credit risk exposures within the overall fixed income portfolio. Each individual portfolio within fixed income is managed in accordance with operational guidelines that are specific as to permissible credit quality ranges, exposure levels within individual quality tiers, and average credit quality.

Credit risk for derivative instruments held by the System results from counterparty risk assumed by MOSERS. This is essentially the risk that the counterparty to a MOSERS transaction will be unable to meet its obligation. Information regarding MOSERS’ credit risk related to derivatives is found under the derivatives disclosures beginning on page 41 of the notes.

The commingled fund - investment grade fixed income funds are invested and reinvested primarily in a portfolio of U.S. dollar denominated investment grade securitized debt obligations, with the objective of approximating the total rate of return of the market for debt securities as defined by the *Bloomberg U.S. Securitized Index*. The average rating for the underlying securities within this fund is AA+.

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

Fixed Income Security Type	Fair Value June 30, 2023	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
U.S. government agencies	\$ 350,664	0.0%	AA-	See below
U.S. government mortgages	27,491	0.0	AA+	See below
Asset-backed securities	7,354,888	0.1	AAA	See below
Collateralized mortgage obligations	296,515	0.0	AA+	See below
Corporate bonds	197,220,070	3.0	BBB+	See below
Municipal bonds	8,905,234	0.1	AA	See below
Non-U.S. sovereign	5,315,778	0.1	BBB+	See below
Total nongov't. guaranteed fixed income securities	219,470,640	3.3		
Nongov't. guaranteed repurchase agreements	450,000,000	6.9	Not rated	None
Bank deposits held in STIF account	750,000,000	11.4	FDIC insured	None
Commingled funds - investment grade fixed income	253,288,289	3.9	Not rated	None
Pooled instruments	25,654,000	0.4	AAA	None
Total nongov't. guaranteed securities	\$ 1,698,412,929	25.9%		
U.S. government securities held in portfolio	\$ 4,310,367,441	65.8%		
Repurchase agreement with U.S. government securities held as collateral	545,000,000	8.3		
Total fixed income securities	\$ 6,553,780,370	100.0%		

Ratings Dispersion Detail - Fair Value

Credit Rating Level	U.S. Government Agencies	U.S. Government Mortgages	Asset-Backed Securities	Collateralized Mortgage Obligations	Corporate Bonds	Municipal Bonds	Non-U.S. Sovereign
AAA	\$ 0	\$ 0	\$ 7,336,127	\$ 0	\$ 6,396,285	\$ 1,985,176	\$ 0
AA	350,664	27,491	0	296,515	6,554,343	4,524,337	788,116
A	0	0	0	0	75,957,768	2,287,510	1,555,507
BBB	0	0	0	0	105,920,827	108,211	2,972,155
BB	0	0	0	0	2,390,847	0	0
Not rated	0	0	18,761	0	0	0	0
	\$ 350,664	\$ 27,491	\$ 7,354,888	\$ 296,515	\$ 197,220,070	\$ 8,905,234	\$ 5,315,778

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed by using the effective duration or option adjusted methodology. It is widely used in the management of fixed income assets by quantifying the risk of interest rate changes. This methodology takes into account optionality on bonds and scales the risk of price changes on bonds depending upon the degree of change in rates and the slope of the yield curve. Within the investment policy, operational guidelines specify the degree of interest rate risk taken within the System's fixed income portfolios, with the exception of some portfolios in which credit risk is the predominant factor and is also controlled by specific guidelines. MOSERS believes that the reporting of effective duration found in the tables below quantifies to the fullest extent possible the interest rate risk of the System's fixed income securities.

MOSERS invests in mortgage-backed securities, which have embedded within them the option of being called, whereby the issuer has the option to keep the debt outstanding in rising interest rate environments or repay the debt in declining interest rate environments, a factor that advantages the issuer. This risk is incorporated within the effective duration calculation used in the interest rate risk analysis.

Effective Duration of Fixed Income Assets by Security Type

Fixed Income Security Type	Fair Value June 30, 2023	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	\$ 4,310,367,441	65.8%	8.9	See below
U.S. government agencies	350,664	0.0	8.2	None
U.S. government mortgages	27,491	0.0	3.8	None
Asset-backed securities	7,354,888	0.1	2.4	None
Collateralized mortgage obligations	296,515	0.0	0.2	None
Corporate bonds	197,220,070	3.0	7.7	None
Municipal bonds	8,905,234	0.1	8.3	None
Non-U.S. sovereign	5,315,778	0.1	10.8	None
Bank deposits held in STIF account	750,000,000	11.4	0.0	None
Repurchase agreements	995,000,000	15.2	0.0	None
Commingled funds - investment grade fixed income	253,288,289	3.9	5.9	None
Pooled instruments	25,654,000	0.4	0.0	None
	<u>\$ 6,553,780,370</u>	<u>100.0%</u>	<u>6.3</u>	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2023	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	\$ 202,285,501	0.3	0.0
1- to 10-year maturities	2,337,867,897	4.4	2.4
Long coupon treasuries	1,770,214,043	15.7	6.5
	<u>\$ 4,310,367,441</u>		<u>8.9</u>

Repurchase Agreements

Tri-party repurchase agreements (repos) are a secured loan by a financial institution with the collateral held at a custodian bank. In a tri-party repo transaction, MOSERS transfers cash to a financial institution and the financial institution transfers securities to the custodian bank. Simultaneously, the financial institution promises to repay the loan in the future plus interest in exchange for the return of the securities.

Reverse repurchase agreements (reverse repos) are used to convert securities into cash. In a reverse repo transaction, MOSERS transfers securities that are owned in the portfolio to a financial institution and the financial institution transfers cash to MOSERS. Simultaneously, MOSERS promises to repay the loan in the future plus interest in exchange for the return of the securities.

Typical collateral for repos and reverse repos include treasury securities, agency securities, mortgage-backed securities, investment grade corporate bonds, commercial paper, and common stock. Repos and reverse repos are typically done for an overnight term; however, they can be done for a longer term. MOSERS enters into repo transactions to earn interest on short-term funds and enters into reverse repos to finance the purchase of additional securities.

The yield earned by MOSERS on the repo transactions ranged from 1.50% to 5.17% with maturities of one to five days.

The yield earned by the counterparties on the reverse repo transactions ranged from 2.09% to 5.40% and had maturities of one month to one year. The maturities of the investments made with reverse repo proceeds generally have maturities of one to 30 years.

In repo transactions, MOSERS may have credit risk if the counterparty fails to repay the loan and the value of the securities held as collateral falls below the loan balance. To minimize this risk, MOSERS requires the financial institution to send collateral with a fair value greater than the value of the loan and revalues the collateral on a daily basis. As of fiscal year end, MOSERS held approximately \$23.9 million of counterparty collateral in excess of the repo balance.

In a reverse repo transaction, MOSERS may be subject to credit risk if the counterparty fails to return the securities and the value of the securities held as collateral rise above the loan balance. To minimize this risk, MOSERS sends the minimum amount of collateral required by the financial institution and requires the financial institution to revalue the collateral and return excess collateral on a daily basis. Counterparties held approximately \$2.5 million of MOSERS' collateral in excess of the reverse repo balance as of the end of the fiscal year.

The tables below summarize MOSERS' exposure for repo and reverse repo transactions.

Tri-Party Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2023	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2023	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 556,008,208	\$ 545,000,000	\$ 11,008,208	
U.S. government agencies	408,000,000	400,000,000	8,000,000	
Common stock	55,000,132	50,000,000	5,000,132	
Accrued interest	0	140,904	(140,904)	
	<u>\$ 1,019,008,340</u>	<u>\$ 995,140,904</u>	<u>\$ 23,867,436</u>	2.4%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2023	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2023	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	\$ 3,645,574,344	\$ 3,603,920,038	\$ 41,654,306	
Payables	14,280,686	0	14,280,686	
Accrued interest	0	53,454,120	(53,454,120)	
	<u>\$ 3,659,855,030</u>	<u>\$ 3,657,374,158</u>	<u>\$ 2,480,872</u>	0.1 %

Foreign Currency Risk

Foreign currency risk is the risk that changes to foreign exchange rates will adversely impact the fair value of non-U.S. Dollar denominated assets. The following table summarizes MOSERS' exposure to foreign currencies for all assets that are held in custody at the System's custodial bank. MOSERS has exposure to foreign currencies in other areas of the portfolio, such as commingled international funds, hedge funds, and private partnerships, which are held in the custody of other banks acting as administrators for the funds. MOSERS' exposure to foreign currency risk in U.S. dollars, as of June 30, 2023, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Total
Australian Dollar	\$ 8,017,553	\$ 0	\$ 0	\$ 8,017,553
Canadian Dollar	5,398,846	0	0	5,398,846
Euro	4,899,816	247,767	697,847	5,845,430
Hong Kong Dollar	(7,137,412)	0	0	(7,137,412)
Japanese Yen	(509,694)	1,891,326	(266,233)	1,115,399
South African Rand	(859,233)	0	0	(859,233)
South Korean Won	867,486	463,968	0	1,331,454
United Kingdom Pound Sterling	1,235,969	0	0	1,235,969
	\$ 11,913,331	\$ 2,603,061	\$ 431,614	\$ 14,948,006

Derivatives

Derivative instruments are financial contracts whose values depend on the values of one or more underlying assets, reference rates, or financial indexes. They include futures contracts, swap contracts, options contracts, and forward foreign currency exchange. The following tables summarize the various contracts in the portfolio as of June 30, 2023.

Futures Contracts

Futures Contract	Notional Value	Exposure
Currency futures	\$ (3,652,519)	\$ 898,335
Fixed income futures	(105,470,121)	1,240,677
Equity index futures	54,916,162	2,400,798
Commodity futures	(11,227,910)	(984,042)
Total	\$ (65,434,388)	\$ 3,555,768

Swap Contracts

Counterparty Credit Rating	Notional Value	Exposure
Total return swaps - equity		
A+	\$ 1,965,702,804	\$ 78,290,405
Total	\$ 1,965,702,804	\$ 78,290,405
Total return swaps - fixed income		
A+	\$ 537,139,959	\$ (1,676,136)
A	126,077,525	0
Total	\$ 663,217,484	\$ (1,676,136)
Total return swaps - commodities		
A+	\$ 304,095,365	\$ 0
A	120,957,507	0
Total	\$ 425,052,872	\$ 0

While the Board has no formal policy specific to derivatives, the MOSERS investment implementation program, through its external managers, holds investments in futures contracts and swap contracts. MOSERS enters into these certain derivative instruments as investments primarily to enhance the performance and reduce the volatility of its portfolio. It enters swaps and futures contracts to gain or hedge exposure to certain markets and to manage interest rate risk.

The notional values associated with these derivative instruments are generally not recorded in the financial statements; however, the fair values of these instruments are recorded in the *Statements of Fiduciary Net Position* and the total changes in fair value for the year are included as net appreciation in fair value of investments in the *Statements of Changes in Fiduciary Net Position*. For the year ended June 30, 2023, the change in fair value in the swap contracts resulted in a gain of \$128 million of investment income. The change in fair value in the futures contracts resulted in a loss of \$132 thousand of investment income. Foreign currency risk associated with derivative activities is included in the *Currency Exposures by Asset Class* table. MOSERS does not anticipate additional significant market risk from the derivative arrangements.

MOSERS could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. MOSERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MOSERS anticipates that the counterparties will be able to satisfy their obligations under the contracts. Investments in limited partnerships and commingled funds may include derivatives that are not shown in the derivative totals.

Securities Lending Program

The Board of Trustees' *Investment Policy Statement* permits the pension trust funds to participate in a securities lending program. Fixed income, international equity, and domestic equity securities of the pension trust funds are loaned to participating brokers who provide collateral in the form of cash, U.S. Treasury or government agency securities, or letters of credit issued by approved banks. Collateral must be provided in the amount of 102% of fair value for domestic loans and 105% of fair value for international loans. MOSERS does not have the authority to pledge or sell collateral securities, without borrower default.

There was no securities lending activity in fiscal year 2023.

Note 4 – Capital Assets

Office building, furniture, fixtures, equipment, and software costing \$10,000 or more are capitalized. Capital assets are valued at cost and reported net of accumulated depreciation. Improvements, which increase the useful life of the property, are also capitalized. The cost of internally developed software incurred during the application development state, including staff payroll costs, are capitalized in accordance with GASB Statement No. 51. Maintenance and repairs are charged to expense as incurred. Depreciation is computed using the straight-line method over the estimated useful life of the related assets according to the following guidelines:

- 5 years for furniture, fixtures, and equipment
- 40 years for building
- 5 years for software and licensing

Schedules of the capital asset account balances for the year ended June 30, 2023, are as follows:

Capital Assets

	Right-to-Use Assets	CIP - Internally Developed Pension Admin. System	Building and Building Improvements *	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets						
Balances June 30, 2022	\$ 782,185	\$ 10,726,125	\$ 4,392,884	\$ 2,118,631	\$ 728,761	\$ 18,748,586
Additions	596,178	959,276	82,787	0	0	1,638,241
Deletions	0	0	0	(2,237)	0	(2,237)
Capital assets June 30, 2023	1,378,363	11,685,401	4,475,671	2,116,394	728,761	20,384,590
Accumulated depreciation						
Balances June 30, 2022	190,195	0	2,246,613	1,349,819	724,152	4,510,779
Depreciation expense	406,540	0	104,309	215,840	526	727,215
Deletions	0	0	0	(2,237)	0	(2,237)
Accumulated depreciation June 30, 2023	596,735	0	2,350,922	1,563,422	724,678	5,235,757
Net capital assets June 30, 2023	\$ 781,628	\$ 11,685,401	\$ 2,124,749	\$ 552,972	\$ 4,083	\$ 15,148,833

* Building and Building Improvements includes \$267,286 of land that the building is situated on.

Capital Assets - Right-to-Use Assets

	Right-to-Use Assets Buildings	Right-to-Use Assets Software	Total Right-to-Use Assets
Right-to-use assets			
Balances June 30, 2022	\$ 278,312	\$ 503,873	\$ 782,185
Additions	0	596,178	596,178
Right-to-use assets June 30, 2023	278,312	1,100,051	1,378,363
Accumulated depreciation			
Balances June 30, 2022	36,606	153,589	190,195
Depreciation expense	89,223	317,317	406,540
Accumulated depreciation June 30, 2023	125,829	470,906	596,735
Net right-to-use assets June 30, 2023	\$ 152,483	\$ 629,145	\$ 781,628

Right-to-Use Assets

Right-to-use assets consist of leased office space and subscription-based software. The intangible right-to-use assets and related liabilities are recorded under GASB Statement No. 87, *Leases*, and GASB Statement No. 96, *Subscription-Based Information Technology Arrangements*. The capitalized value of right-to-use assets and lease liabilities has been calculated based on the future lease payments, discounted to present value. Accounting standards require organizations to determine their discount rate based on their incremental borrowing costs. As an institutional investor, treasury rates were the primary factor MOSERS used to determine a discount rate for the purpose of present valuing right-to-use assets and lease liabilities. MOSERS used a 4% discount rate to calculate the present value of the lease liabilities recognized during the fiscal year ended June 30, 2023. The difference between the liability booked to record the present value of these future payment obligations, and the actual lease payments, is reported as interest expense.

The recording of these liabilities resulted in a future minimum lease commitment, as follows:

Schedule of Minimum Lease Commitments

Year Ended June 30	Building			Software		
	Principal	Imputed Interest	Total	Principal	Imputed Interest	Total
2024	\$ 94,834	\$ 3,288	\$ 98,122	\$ 295,208	\$ 22,158	\$ 317,366
2025	57,649	578	58,227	171,896	13,149	185,045
2026	0	0	0	162,041	6,482	168,523
Total commitments	\$ 152,483	\$ 3,866	\$ 156,349	\$ 629,145	\$ 41,789	\$ 670,934

The changes in the lease liability amounts are reported in the following table:

Schedule of Changes in Lease Liability Amount

	Right-to-Use Assets Buildings	Right-to-Use Assets Software	Total Right-to-Use Assets
Balances June 30, 2022	\$ 241,706	\$ 350,284	\$ 591,990
Increases to liability	0	596,178	596,178
Decreases from liability	(89,223)	(317,317)	(406,540)
Net capital assets June 30, 2023	\$ 152,483	\$ 629,145	\$ 781,628

Note 5 – Employers’ Net Pension Liability

The components of net pension liability as of June 30, 2023, are in the *Schedule of Employers’ Net Pension Liability* below.

Schedule of Employers’ Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	\$ 16,190,813,686	\$ 654,242,323
MOSERS’ fiduciary net position	8,557,793,248	190,226,755
Employers’ net pension liability	\$ 7,633,020,438	\$ 464,015,568
Plan net position as a percentage of the total pension liability	52.86%	29.08%
Covered payroll	\$ 2,211,853,954	\$ 64,923,979
Employers’ net pension liability as a percentage of covered payroll	345.10%	714.71%

An actuarial valuation of an ongoing plan involves estimates of the reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and future salary increases. Amounts determined regarding the net pension liability are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The *Schedule of Changes in Employers’ Net Pension Liability* presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. These schedules are presented in the *Required Supplementary Information*. The total pension liability, as of June 30, 2023, is \$16,190,813,686 for the MSEP and \$654,242,323 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2023, and a measurement date of June 30, 2023, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

An actuarial experience study covering the five-year period ended June 30, 2020, was performed in 2021. A summary of the assumptions used to calculate the net pension liability is contained in the table below.

Summary of Actuarial Assumptions for the MSEP & the Judicial Plan Used to Determine Net Pension Liability

Valuation date	June 30, 2023
Actuarial cost method	Entry Age Normal
Asset valuation method	Fair value
Investment rate of return, net of investment expense	6.95 %
Projected salary increases	2.75 – 10.00% (MSEP) 3.00% (Judicial Plan)
Rate of payroll growth	2.25 %
COLAs	4% or 1.80% *
Price inflation	2.25%

* 4.00% compounded annually, when a minimum COLA of 4.00% is in effect. 1.80% compounded annually, when no minimum COLA is in effect (80% of price inflation).

Mortality Rates - MSEP

Pre-retirement mortality rates were based on the Pub-2010 General Members Below Median Employee mortality table, set back two years for males and set forward one year for females. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for retirees were based on the Pub-2010 General Members Below Median Healthy Retiree mortality table, scaled by 104%, set back two years for males and set forward one year for females. Mortality projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for beneficiaries were based on the Pub-2010 General Members Below Median Contingent Survivor mortality table, set back two years for males and set forward one year for females. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Disabled mortality rates were based on the Pub-2010 Non-Safety Disabled Retiree mortality table, without mortality projection.

Mortality Rates - Judicial Plan

Pre-retirement mortality rates were based on the Pub-2010 General Members Median Employee mortality table.

Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for retirees were based on the Pub-2010 General Members Median Healthy Retiree mortality table. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Post-retirement mortality rates for beneficiaries were based on the Pub-2010 General Members Median Contingent Survivor mortality table. Mortality was projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020.

Discount Rate

The discount rate used to measure the total pension liability was 6.95%, net of investment expenses. The projection of cash flows used to determine the discount rate assumed that contributions from participating employers will be made using the actuarially determined rates. Based on those assumptions, MOSERS' fiduciary net position was projected to be available to make all the projected future benefit payments of the current plan members. As a result, the long-term expected rate of return on pension plan investments, net of investment expense, of 6.95% was applied to all periods of projected benefit payments to determine the total pension liability.

The table below presents the net pension liability of the plans, as of June 30, 2023, calculated using the discount rate of 6.95%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (5.95%) or 1% higher (7.95%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

Employers' Net Pension Liability	1% Decrease 5.95%	Current Discount Rate 6.95%	1% Increase 7.95%
MSEP	\$ 9,514,936,218	\$ 7,633,020,438	\$ 6,060,958,468
Judicial Plan	\$ 527,860,952	\$ 464,015,568	\$ 409,270,520

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 99.

Note 6 – Retiree Life Insurance and Long-Term Disability Insurance Programs

In addition to the defined benefit pension provided through MOSERS, the state of Missouri also funds, either partially or in its entirety, retiree life insurance, and long-term disability insurance programs for eligible members. These insurance programs are underwritten by The Standard. MOSERS collects premiums for participants of these programs and remits them to the The Standard on behalf on the state of Missouri.

Retiree Life Insurance

Members who retire on or after October 1, 1985, are eligible for \$5,000 of state-sponsored basic life insurance coverage if they retire directly from active employment. As of June 30, 2023, 30,139 retirees were participating in the program. This insured defined benefit coverage is financed on a percentage of payroll (.115%) and is purchased as a group policy through The Standard. The cost for the year ended June 30, 2023, was \$2,175,731. Premiums are contributed entirely by the state and its component employers as provided by Section 104.515, RSMo.

Retirees of the Department of Labor and Industrial Relations (DOLIR), who retired prior to January 1, 1996, are eligible for state-sponsored insured defined benefit insurance coverage in the same amount of coverage they were receiving through the DOLIR. As of June 30, 2023, 73 retirees were participating in the program. The coverage for this closed group is purchased as a group policy at a current cost of \$2.07 per thousand dollars of coverage, per month, per eligible participant (\$9,085 for the year ended June 30, 2023). Premiums are paid entirely by the DOLIR as provided by Section 288.225, RSMo. Retirees of the DOLIR who retired on or after January 1, 1996, are eligible for \$5,000 of state-sponsored life insurance coverage if they retire directly from active employment. They are included in the group described in the preceding paragraph.

Long-Term Disability Insurance (LTD)

MOSERS provides LTD coverage for eligible members and generally includes those active members of MOSERS' retirement plans who do not have other disability coverage and are not yet eligible to receive normal (unreduced) retirement benefits.

There were 31,232 members covered under the program as of June 30, 2023. This insured defined benefit coverage is financed on a percentage of covered payroll (0.0445%). Purchased as a group policy, LTD is administered by The Standard. The cost for the year ended June 30, 2023, was \$7,654,825. Premiums are contributed by the state and its component employers, as provided for by Section 104.515, RSMo.

Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program

MOSERS participates as an employer in a cost-sharing, multiple-employer, defined benefit, other post-employment benefits plan, the State Retiree Welfare Benefit Trust (SRWBT), operated by Missouri Consolidated Health Care Plan (MCHCP). Employees may participate at retirement if eligible to receive a monthly retirement benefit from MOSERS. The terms and conditions governing post-employment benefits are vested with the MCHCP Board of Trustees within the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. The SRWBT does not issue a separate stand-alone financial report. Financial activity of the SRWBT is included in the *MCHCP Annual Comprehensive Financial Report* as a fiduciary fund and is intended to present only the financial position of the activities attributable to the SRWBT. Additionally, MCHCP is considered a component unit of the state of Missouri reporting entity and is included in the state's financial report.

The Plan's financial statements are available on the MCHCP's website at www.mchcp.org.

Benefits

The SRWBT was established and organized on June 27, 2008, pursuant to Sections 103.003 through 103.178, RSMo, to provide health and welfare benefits for the exclusive benefit of current and future retired employees of the state and their dependents who meet eligibility requirements, except for those retired members covered by other OPEB plans of the state. The three medical plans from MCHCP offer the same basic coverage such as preventative care, freedom to choose care from a nationwide network of primary care providers, specialists, pharmacies, and hospitals, usually at a lower negotiated group discount and the same covered benefits for both medical and pharmacy. Benefits are the same in all three plans; other aspects differ such as premium, deductible, and out-of-pocket costs. Retiree benefits are the same as for active employees, until they are Medicare eligible.

Contributions

Contributions are established, and may be amended by the MCHCP Board of Trustees, with the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. For the fiscal year ended June 30, 2022, employers were required to contribute 4.34% of gross active employee payroll for the period July 1, 2021, through December 31, 2021, and 4.29% for the period January 1, 2022, through June 30, 2022. Employees do not contribute to this plan.

OPEB Liabilities, OPEB Expense, Deferred Outflows of Resources, and Deferred Inflows of Resources

At June 30, 2023, MOSERS reported a liability of \$5,635,287 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2022, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date. MOSERS' proportion of the net OPEB liability was based on a projection of its long-term share of contributions to the OPEB plan relative to the projected contributions of all participating entities, actuarially determined. At June 30, 2022, MOSERS' proportionate share was 0.4000%. For the year ended June 30, 2023, MOSERS recognized a net increase in administrative costs of \$241,294 related to OPEB expense. As of June 30, 2023, MOSERS reported deferred outflows of resources and deferred inflows of resources as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	\$ 235,653	\$ 55,644
Changes of assumptions	0	1,984,764
Net difference between projected and actual earnings on plan investments	51,299	0
Changes in proportion and differences between MOSERS' contributions and proportionate share of contributions	504,826	216,585
MOSERS' contributions subsequent to the measurement date	286,406	0
	<u>\$ 1,078,184</u>	<u>\$ 2,256,993</u>

The \$286,406 currently reported as deferred outflows of resources related to OPEB resulting from MOSERS' contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ended June 30, 2024. Other amounts reported as deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care to be Recognized in Future Years

Year Ending June 30

2024	\$	223,242
2025		224,105
2026		227,356
2027		212,565
2028		233,219
Thereafter		344,728
Total	\$	1,465,215

Actuarial Assumptions

The collective total OPEB liability for the June 30, 2022, measurement date was determined by an actuarial valuation as of July 1, 2022. This actuarial valuation used the following actuarial assumptions:

Summary of MCHCP's Actuarial Assumptions for Post-Employment Retiree Health Care

Valuation year	July 1, 2021 - June 30, 2022
Actuarial cost method	Entry age normal, level percentage of payroll
Asset valuation method	Fair value
Discount rate	5.50%
Projected payroll growth rate	4.0%
Inflation rate	3.0%
Health care cost trend rate (medical & prescription drugs combined)	
Non-Medicare	6.5% *
	* (6.50% in fiscal 2023 through 2025, then decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2031 and later)
Medicare	14.50% **
	** (rate changes to 15.0% in fiscal year 2024, 11.5% in fiscal 2025, 10.5% in fiscal 2026, then decreases by 0.75% per year to a rate of 5.25% in fiscal 2033, then 5.0% in fiscal 2034 and after.)

Mortality: *Pre-Retirement*: Pri-2012 Employee Amount-weighted Mortality Table projected generationally using MP-2021.

Annuitant: Pri-2012 Retiree Amount-weighted Mortality Table projected generationally using MP-2021.

The last experience study was conducted in 2020. Termination rates and retirement rates are updated based on an experience study conducted in 2020. Participation and dependent coverage assumptions were updated based upon an experience study conducted in July 2020. Per capita claims costs, administrative expenses, and retiree contributions were updated based on analysis of 2023 rates.

Change in Assumptions and Methods Since Prior Valuation

The discount rate was changed to 5.50% from 4.50%. Per capita health costs, administrative expenses, and retiree contributions were updated based on an analysis of 2023 rates. Trend rates were updated based on anticipated future experience.

Sensitivity to Changes in the Health Care Cost Trend Rates

The following table presents MOSERS' net OPEB liability, calculated using the current trend rate, as well as what the net OPEB liability would be if it were calculated using a trend rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Health Care Cost Trend Rates

	1% Decrease in Trend Rates	Current Trend Rates	1% Increase in Trend Rates
Net OPEB liability	\$ 4,815,264	\$ 5,635,287	\$ 6,655,333

Discount Rate

A discount rate of 5.5% was used to measure the total OPEB liabilities. The projection of cash flows used to determine the discount rate assumed that contributions from plan members will be made at the current contribution rates and the contributions will be made at statutorily required rates, actuarially determined. This discount rate was determined as the best estimate of the expected return on plan assets as of the measurement date.

Sensitivity to Changes in the MCHCP Discount Rate

The following table presents MOSERS' net OPEB liability, calculated using a discount rate of 5.5%, as well as what the net OPEB liability would be if it were calculated using a discount rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Discount Rate

	1% Decrease in Discount Rate (4.5%)	Current Discount Rate (5.5%)	1% Increase in Discount Rate (6.5%)
Net OPEB liability	\$ 6,642,789	\$ 5,635,287	\$ 4,826,223

Long-Term Expected Rate of Return

The target allocation and expected real rate of return for each major asset class are listed below:

MCHCP's Long-Term Expected Rate of Return

Asset Class	Target Allocation	Expected Real Rate of Return
Large cap stocks	19.0%	8.5%
Mid cap stocks	6.0	8.8
Small cap stocks	9.0	8.8
International stocks	5.0	9.0
BarCap aggregate bonds	59.0	3.9
Cash equivalents	2.0	2.8

Note 8 – Commitments

As of June 30, 2023, MOSERS has \$956.0 million in unfunded commitments in the private asset class.

MOSERS has contracted with various software and consulting firms to provide and implement a pension administration system at a cost of approximately \$10.3 million. In addition to the cost of the system, MOSERS has engaged consultants to assist with project governance, change management, and data validation. The contracts for these consulting services have an approximate cost of \$2.8 million. As of June 30, 2023, the remaining commitments on these agreements was approximately \$3.3 million.

Note 9 – Contingencies

There were no contingencies which would have a material impact on the financial statements as of June 30, 2023.

Note 10 – Risk Management

MOSERS is exposed to various risks of loss related to natural disasters, errors and omissions, loss of assets, torts, etc. MOSERS has chosen to cover such losses through the purchase of commercial insurance to help mitigate some of the exposure to those risks. In the previous three years, MOSERS has not experienced any losses that exceeded our insurance coverage limits.

Schedule of Changes in Employers' Net Pension Liability - MSEP

Last Ten Fiscal Years

	2023	2022	2021	2020	2019
Total pension liability					
Service cost	\$ 166,052,284	\$ 166,110,518	\$ 162,668,072	\$ 159,559,528	\$ 158,190,866
Interest on the total pension liability	1,037,223,987	1,017,493,541	959,662,398	960,644,327	956,725,536
Benefit changes	0	0	0	0	0
Difference between expected and actual experience	570,092,422	77,335,262	133,886,066	(70,371,777)	7,426,685
Assumption changes	0	0	515,859,705	124,766,739	74,340,841
Benefit payments and member refunds	(991,550,039)	(962,590,826)	(919,838,592)	(873,816,238)	(851,821,580)
Net change in total pension liability	781,818,654	298,348,495	852,237,649	300,782,579	344,862,348
Total pension liability - beginning	15,408,995,032	15,110,646,537	14,258,408,888	13,957,626,309	13,612,763,961
Total pension liability - ending (a)	<u>\$16,190,813,686</u>	<u>\$15,408,995,032</u>	<u>\$15,110,646,537</u>	<u>\$14,258,408,888</u>	<u>\$13,957,626,309</u>
Plan fiduciary net position					
Employer contributions	\$ 1,080,661,379	\$ 471,302,256	\$ 463,293,368	\$ 436,895,653	\$ 394,150,042
Employee contributions	48,487,731	39,809,873	37,571,263	35,141,960	31,286,632
Pension plan net investment income (loss)	177,598,790	(816,407,543)	2,032,991,086	400,354,303	313,159,178
Benefit payments and member refunds	(991,550,039)	(962,590,826)	(919,838,592)	(873,816,238)	(851,821,580)
Pension plan administrative expense	(10,984,550)	(9,248,916)	(8,816,943)	(8,398,164)	(9,200,826)
Other	5,165,340	5,619,673	3,899,365	4,187,740	4,383,409
Net change in plan fiduciary net position	309,378,651	(1,271,515,483)	1,609,099,547	(5,634,746)	(118,043,145)
Plan fiduciary net position - beginning	8,248,414,597	9,519,930,080	7,910,830,533	7,916,465,279	8,034,508,424
Plan fiduciary net position - ending (b)	<u>8,557,793,248</u>	<u>8,248,414,597</u>	<u>9,519,930,080</u>	<u>7,910,830,533</u>	<u>7,916,465,279</u>
Net pension liability - ending (a)-(b)	<u>\$ 7,633,020,438</u>	<u>\$ 7,160,580,435</u>	<u>\$ 5,590,716,457</u>	<u>\$ 6,347,578,355</u>	<u>\$ 6,041,161,030</u>
Plan fiduciary net position as a percentage of total pension liability	52.86%	53.53%	63.00%	55.48%	56.72%
Covered payroll	\$ 2,211,853,954	\$ 2,004,688,456	\$ 2,024,883,601	\$ 2,006,870,248	\$ 1,950,272,350
Net pension liability as a percentage of covered payroll	345.10%	357.19%	276.10%	316.29%	309.76%

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - MSEP (continued)

Last Ten Fiscal Years

	2018	2017	2016	2015	2014
Total pension liability					
Service cost	\$ 157,351,979	\$ 152,766,134	\$ 149,021,755	\$ 150,412,577	\$ 158,116,026
Interest on the total pension liability	956,201,619	945,654,398	913,877,923	896,451,618	869,878,195
Benefit changes	0	(1,696,059)	0	0	0
Difference between expected and actual experience	(118,252,032)	(104,203,260)	61,150,083	(27,983,267)	12,376,237
Assumption changes	351,899,973	202,554,786	656,805,085	(57,568,553)	0
Benefit payments and member refunds	(886,711,473)	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
Net change in total pension liability	460,490,066	401,111,142	1,023,544,343	233,046,575	359,934,351
Total pension liability - beginning	13,152,273,895	12,751,162,753	11,727,618,410	11,494,571,835	11,134,637,484
Total pension liability - ending (a)	<u>\$13,612,763,961</u>	<u>\$13,152,273,895</u>	<u>\$12,751,162,753</u>	<u>\$11,727,618,410</u>	<u>\$11,494,571,835</u>
Plan fiduciary net position					
Employer contributions	\$ 379,557,962	\$ 335,217,422	\$ 329,957,369	\$ 329,752,832	\$ 326,370,336
Employee contributions	28,303,994	25,439,343	21,684,920	18,099,455	14,025,328
Pension plan net investment income (loss)	576,188,826	272,595,668	1,740,269	(237,070,529)	1,193,952,121
Benefit payments and member refunds	(886,711,473)	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
Pension plan administrative expense	(9,799,256)	(8,759,341)	(8,489,375)	(8,077,692)	(7,336,922)
Other	1,610,073	5,668,849	4,923,622	5,434,820	296,369,500
Net change in plan fiduciary net position	89,150,126	(163,802,916)	(407,493,698)	(620,126,914)	1,142,944,256
Plan fiduciary net position - beginning	7,945,358,298	8,109,161,214	8,516,654,912	9,136,781,826	7,993,837,570
Plan fiduciary net position - ending (b)	<u>8,034,508,424</u>	<u>7,945,358,298</u>	<u>8,109,161,214</u>	<u>8,516,654,912</u>	<u>9,136,781,826</u>
Net pension liability - ending (a)-(b)	<u>\$ 5,578,255,537</u>	<u>\$ 5,206,915,597</u>	<u>\$ 4,642,001,539</u>	<u>\$ 3,210,963,498</u>	<u>\$ 2,357,790,009</u>
Plan fiduciary net position as a percentage of total pension liability	59.02%	60.41%	63.60%	72.62%	79.49%
Covered payroll	\$ 1,951,454,817	\$ 1,975,353,105	\$ 1,921,528,936	\$ 1,918,527,768	\$ 1,902,719,928
Net pension liability as a percentage of covered payroll	285.85%	263.59%	241.58%	167.37%	123.92%

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan

Last Ten Fiscal Years

	2023	2022	2021	2020	2019
Total pension liability					
Service cost	\$ 13,037,787	\$ 13,303,763	\$ 12,872,644	\$ 13,119,646	\$ 13,573,453
Interest on the total pension liability	42,246,794	42,073,646	42,004,675	42,458,800	41,710,768
Benefit changes	0	0	0	0	0
Difference between expected and actual experience	14,023,318	(9,088,237)	(6,886,109)	(14,933,643)	978,884
Assumption changes	0	0	(4,928,456)	6,341,771	5,024,057
Benefit payments and member refunds	(45,108,589)	(42,530,378)	(41,625,546)	(39,622,268)	(37,593,049)
Net change in total pension liability	24,199,310	3,758,794	1,437,208	7,364,306	23,694,113
Total pension liability - beginning	630,043,013	626,284,219	624,847,011	617,482,705	593,788,592
Total pension liability - ending (a)	\$ 654,242,323	\$ 630,043,013	\$ 626,284,219	\$ 624,847,011	\$ 617,482,705
Plan fiduciary net position					
Employer contributions	\$ 39,064,758	\$ 39,228,848	\$ 39,996,509	\$ 39,174,515	\$ 38,604,668
Employee contributions	1,746,913	1,550,712	1,448,428	1,314,570	1,138,101
Pension plan net investment income (loss)	4,165,663	(18,801,946)	44,049,707	8,162,709	6,051,941
Benefit payments	(45,108,589)	(42,530,378)	(41,625,546)	(39,622,268)	(37,593,049)
Pension plan administrative expense	(91,076)	(79,492)	(75,822)	(74,450)	(72,141)
Other	0	0	0	0	3,895
Net change in plan fiduciary net position	\$ (222,331)	\$ (20,632,256)	\$ 43,793,276	\$ 8,955,076	\$ 8,133,415
Plan fiduciary net position - beginning	190,449,086	211,081,342	167,288,066	158,332,990	150,199,575
Plan fiduciary net position - ending (b)	190,226,755	190,449,086	211,081,342	167,288,066	158,332,990
Net pension liability - ending (a)-(b)	\$ 464,015,568	\$ 439,593,927	\$ 415,202,877	\$ 457,558,945	\$ 459,149,715
Plan fiduciary net position as a percentage of total pension liability	29.08%	30.23%	33.70%	26.77%	25.64%
Covered payroll	\$ 64,923,979	\$ 63,333,626	\$ 63,105,884	\$ 61,402,061	\$ 60,594,362
Net pension liability as a percentage of covered payroll	714.71%	694.09%	657.95%	745.18%	757.74%

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan (continued)

Last Ten Fiscal Years

	2018	2017	2016	2015	2014
Total pension liability					
Service cost	\$ 12,997,198	\$ 12,945,567	\$ 10,932,097	\$ 10,613,686	\$ 8,990,293
Interest on the total pension liability	41,018,371	40,617,091	37,755,240	36,161,612	34,013,615
Benefit changes	0	0	0	0	0
Difference between expected and actual experience	(1,319,696)	(10,687,091)	(5,036,696)	5,103,664	13,360,614
Assumption changes	12,332,042	7,905,466	53,991,379	0	0
Benefit payments and member refunds	(35,657,248)	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
Net change in total pension liability	29,370,667	16,796,308	64,652,306	20,633,056	26,957,897
Total pension liability - beginning	564,417,925	547,621,617	482,969,311	462,336,255	435,378,358
Total pension liability - ending (a)	\$ 593,788,592	\$ 564,417,925	\$ 547,621,617	\$ 482,969,311	\$ 462,336,255
Plan fiduciary net position					
Employer contributions	\$ 36,892,203	\$ 34,246,826	\$ 33,642,498	\$ 32,696,686	\$ 29,264,877
Employee contributions	902,319	786,745	661,206	488,193	294,810
Pension plan net investment income (loss)	10,677,666	4,680,131	28,081	(3,610,352)	17,199,701
Benefit payments	(35,657,248)	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
Pension plan administrative expense	(181,595)	(150,387)	(136,983)	(123,015)	(105,693)
Other	(68,711)	0	0	0	4,195,049
Net change in plan fiduciary net position	\$ 12,564,634	\$ 5,578,590	\$ 1,205,088	\$ (1,794,394)	\$ 21,442,119
Plan fiduciary net position - beginning	137,634,941	132,056,351	130,851,263	132,645,657	111,203,538
Plan fiduciary net position - ending (b)	150,199,575	137,634,941	132,056,351	130,851,263	132,645,657
Net pension liability - ending (a)-(b)	\$ 443,589,017	\$ 426,782,984	\$ 415,565,266	\$ 352,118,048	\$ 329,690,598
Plan fiduciary net position as a percentage of total pension liability	25.30%	24.39%	24.11%	27.09%	28.69%
Covered payroll	\$ 59,417,302	\$ 58,591,661	\$ 57,421,016	\$ 55,656,457	\$ 49,587,936
Net pension liability as a percentage of covered payroll	746.57%	728.40%	723.72%	632.66%	664.86%

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

Pension Trust Funds

Schedules of Employer Contributions

Last Ten Fiscal Years

MSEP

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2023	\$ 580,661,379	\$ 1,080,661,379	\$ (500,000,000)	\$ 2,211,853,954	48.86% ***
2022	471,302,256	471,302,256	0	2,004,688,456	23.51
2021	463,293,368	463,293,368	0	2,024,883,601	22.88
2020	436,895,653	436,895,653	0	2,006,870,248	21.77
2019	394,150,042	394,150,042	0	1,950,272,350	20.21
2018	379,557,962	379,557,962	0	1,951,454,817	19.45
2017	322,772,697	335,217,422	(12,444,725)	1,975,353,105	16.97
2016	310,124,928	329,957,369	(19,832,414)	1,921,528,936	16.97
2015	329,752,832	329,752,832	0	1,918,527,768	16.97
2014	326,370,336	326,370,336	0	1,902,719,928	16.98

Judicial Plan

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2023	\$ 39,064,758	\$ 39,064,758	\$ 0	\$ 64,923,979	60.17%
2022	39,228,848	39,228,848	0	63,333,626	61.94
2021	39,996,509	39,996,509	0	63,105,884	63.38
2020	39,174,515	39,174,515	0	61,402,061	63.80
2019	38,604,668	38,604,668	0	60,594,362	63.71
2018	36,892,203	36,892,203	0	59,417,302	62.09
2017	32,670,710	34,246,826	(1,576,116)	58,591,661	58.45
2016	31,604,527	33,642,498	(2,037,971)	57,421,016	58.45
2015	32,696,686	32,696,686	0	55,656,457	58.45
2014	29,264,877	29,264,877	0	49,587,936	59.69

* Since the percent of payroll contributions rate was applied to the pension payroll during the fiscal year, the actuarially determined contribution is equal to the actual contribution. In fiscal years 2016 and 2017, excess contributions were made because the actuarially determined contribution rate fell below the Board-established minimum contribution rate.

** For fiscal years 2016 and prior, covered payroll totals from the valuation report were used, which includes actual covered payroll from July through May with estimated amounts for June. For fiscal years 2017 and forward, covered payroll totals used are actual covered payroll from July through June, as reported in the GASB 67 report.

*** Beginning in fiscal year 2023, the employers were given the option to prepay contributions at certain times during the year and receive an actuarially determined present value discount based on MOSERS' investment return assumption. During fiscal year 2023 MOSERS received a one-time contribution of \$500 million from the state of Missouri.

See accompanying Notes to the Schedules of Required Supplementary Information - Pension Trust Funds.

*Pension Trust Funds***Schedule of Annual Money-Weighted Rate of Return on Investments***Last Ten Fiscal Years*

Year Ended June 30	Annual Money-Weighted Rate of Return - Net of Investment Expense
2023	2.13 %
2022	(8.75)
2021	26.56
2020	5.25
2019	4.10
2018	7.57
2017	3.51
2016	0.08
2015	(2.60)
2014	19.25

See accompanying *Notes to the Schedules of Required Supplementary Information - Pension Trust Funds*.

Notes to the Schedules of Required Supplementary Information - Pension Trust Funds

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2023

The entry age normal actuarial cost method of valuation is used in determining liabilities and normal cost. Regular actuarial valuations provide valuable information about the composite change in the unfunded actuarial accrued liabilities (whether or not the liabilities are increasing or decreasing, and by how much). Since the future cannot be predicted with precision, actual experience is expected to differ from assumed experience. Differences occurring in the past between assumed experience and actual experience (actuarial gains and losses) become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments (principal and interest), which are expressed as a percent of payroll. A layered, closed 25-year amortization period was used for the June 30, 2023, valuations to determine the fiscal year 2025 contribution rates. The actuarial value is calculated by recognizing the difference between the actual and expected return on the fair value of assets each year over a closed five-year period. In addition, the total unrecognized investment experience as of June 30, 2017, will be recognized evenly over a seven-year period beginning June 30, 2018.

The investment return rate assumption remained constant at 6.95% per year, as of June 30, 2023, compounded annually (net of investment expenses). The price inflation assumption used was 2.25% per year. Projected salary assumptions were 2.75% to 10.00% for the MSEP and 3.00% for the Judicial Plan. The assumption used for annual post-retirement benefit increases (COLAs) is 4.0% (on a compound basis) when a minimum COLA is in effect. When no minimum COLA is in effect, the annual COLA is assumed to be 1.80% (80% of the 2.25% price inflation), on a compounded basis.

Actuarial Assumptions and Methods Used to Set the Actuarially Determined Contributions - Five-Year Review

MSEP & Judicial

Valuation year	2023	2022	2021	2020	2019
Contribution rate for fiscal year	2025	2024	2023	2022	2021
Actuarial cost method	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal
Amortization method	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll
Amortization periods	Closed 25-year period	Closed 25-year period	Closed 25-year period	Closed 30-year period	Closed 30-year period
Inflation	2.25%	2.25%	2.25%	2.25%	2.35%
Cost-of-living adjustment	4% or 1.80%	4% or 1.80%	4% or 1.80%	4% or 1.80%	4% or 1.88%
Salary increase	varied	varied	3.00	varied	varied
Payroll growth	2.25%	2.25%	2.25%	2.25%	2.35%
Investment rate of return	6.95%	6.95%	6.95%	6.95%	7.10%

Schedule of Proportionate Share of the Net OPEB Liability

For Years Ended June 30, 2018 – 2023*

State Retiree Welfare Benefit Trust

	2023	2022	2021	2020	2019	2018
MOSERS' proportion of the net OPEB liability	0.4000%	0.3760%	0.4313%	0.4352%	0.4375%	0.4121%
MOSERS' proportionate share of the net OPEB liability	\$ 5,635,287	\$ 6,413,236	\$ 7,682,560	\$ 7,697,649	\$ 7,666,038	\$ 7,272,038
MOSERS' covered payroll	\$ 7,262,074	\$ 7,004,895	\$ 7,569,252	\$ 7,370,032	\$ 7,056,668	\$ 6,669,717
MOSERS' proportionate share of the net OPEB liability as a percentage of its covered payroll	77.60%	91.55%	101.50%	104.45%	108.64%	109.03%
Plan fiduciary net position as a percentage of the total OPEB liability	12.12%	10.14%	8.24%	7.31%	6.90%	6.64%

* The amounts presented in this schedule were determined as of the previous fiscal year end. Intended to show information for 10 years, data for additional years will be displayed as it becomes available.

Schedule of Employer Contributions for OPEB

For Years Ended June 30, 2018 – 2023*

	2023	2022	2021	2020	2019	2018
Contractually required contribution	\$ 286,406	\$ 291,661	\$ 283,613	\$ 311,510	\$ 331,275	\$ 301,182
Contributions in relation to the contractually required contribution	\$ 286,406	\$ 291,661	\$ 283,613	\$ 311,510	\$ 331,275	\$ 301,182
Contribution deficiency (excess)	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
Covered payroll	\$ 7,700,645	\$ 7,262,074	\$ 7,004,895	\$ 7,569,252	\$ 7,370,032	\$ 7,056,668
Contributions as a percentage of covered payroll	3.72%	4.02%	4.05%	4.12%	4.49%	4.27%

* Intended to show information for 10 years, data for additional years will be displayed as it becomes available.

Schedules of Investment Expenses

For the Year Ended June 30, 2023

Investing activity	MSEP	Judicial Plan	Total
Investment management and incentive fees			
Equity			
Artisan International Value Fund	\$ 3,134,829	\$ 69,229	\$ 3,204,058
Baillie Gifford Intl. Alpha Private Equity	1,114,160	24,605	1,138,765
Baillie Gifford EM Private Equity	698,013	15,415	713,428
NS Partners Emerging Markets	1,447,793	31,973	1,479,766
Silchester International Investors	2,009,165	44,370	2,053,535
Multi-asset			
Blackrock	1,246,835	27,535	1,274,370
NISA Investment Advisors	5,014,017	110,729	5,124,746
Alternatives			
ABRDN Eclipse HFRX Macro/CTA SPC	1,630,578	36,009	1,666,587
Aberdeen Davi Alpha	712,435	15,733	728,168
Actis Emerging Markets 3	(349,286)	(7,714)	(357,000)
Actis Emerging Markets 4	(3,804,089)	(84,009)	(3,888,098)
Altas Partners Holdings III LP	8,876	196	9,072
Appian Natural Resources Fund III	415,162	9,168	424,330
Axiom Asia Private Capital Fund II, LP	135,745	2,998	138,743
Axiom Asia Private Capital Fund III, LP	747,362	16,505	763,867
Axiom Asia Fund 6, LP	571,795	12,627	584,422
Axxon Brazil Private Equity Fund II B, LP	153,155	3,382	156,537
Blackstone Real Estate Partners IV	41,985	927	42,912
Blackstone Real Estate Partners V	55,258	1,220	56,478
Blackstone Real Estate Partners VI	(102,515)	(2,264)	(104,779)
Blackstone Real Estate Partners VII	(267,825)	(5,915)	(273,740)
Blackstone Topaz Fund, LP	3,903,810	86,211	3,990,021
Blackstone Topaz Private Credit	2,128,025	46,995	2,175,020
Blue Diamond Non-Directional Fund	2,592,735	57,258	2,649,993
Brevan Howard Alpha Strategies Fund, LP	19,926,261	440,050	20,366,311
Catalyst Fund Limited Partnership III	220,669	4,873	225,542
Catalyst Fund Limited Partnership IV	73,976	1,634	75,610
Catalyst Fund Limited Partnership V	1,864,328	41,172	1,905,500
CBRE U.S. Core Partners, LP	1,552,695	34,290	1,586,985
Centiva Capital	5,727,645	126,489	5,854,134
Cornwall Domestic, LP	27,819	614	28,433
DE Shaw Diopther Fund, LLC	1,054,272	23,282	1,077,554
EIG Energy Fund XIV, LP	101,116	2,233	103,349
EIG Energy Fund XV, LP	94,662	2,090	96,752
EIG Energy Fund XVI, LP	276,929	6,116	283,045
EIG Co-Investment	32,620	720	33,340
Eisler Multi-Strategy Fund, LP	15,854,174	350,123	16,204,297
Elliott International Limited	6,830,249	150,838	6,981,087
Exodus Point Partners Fund	12,914,578	285,205	13,199,783
Farallon Capital Institutional Partners, LP	(8,783)	(194)	(8,977)
Gateway Energy & Resource Holdings, LLC	17,354	383	17,737

Schedule of Investment Expenses continued on following page.

Schedules of Investment Expenses (continued)

For the Year Ended June 30, 2023

Investing activity	MSEP	Judicial Plan	Total
Global Forest Partners GTI7 Institutional Investors Company Ltd.	\$ 5,171	\$ 114	\$ 5,285
Gryphon Partners VI, LP	(464,107)	(10,249)	(474,356)
Harrison Street Real Estate Core Property Fund, LP	1,044,935	23,076	1,068,011
HBK Merger Strategies Offshore Fund, Ltd.	4,011,627	88,592	4,100,219
HIG Middle Mkt LBO Fund IV, LP	1,086,410	23,992	1,110,402
JLL Partners Fund V, LP	(156,372)	(3,453)	(159,825)
JLL Partners Fund VI, LP	(43,382)	(958)	(44,340)
King Street Capital, LP	180,689	3,990	184,679
LaSalle Property Fund	814,005	17,976	831,981
Linden Capital Partners II, LP	(1,101,117)	(24,317)	(1,125,434)
Mercato Partners Traverse IV, LP	3,147,855	69,517	3,217,372
Merit Energy Partners F-II, LP	11,591	256	11,847
MHR Institutional Partners IIA, LP	(719,747)	(15,895)	(735,642)
MHR Institutional Partners III, LP	36,262	801	37,063
MHR Institutional Partners IV, LP	3,102,368	68,512	3,170,880
Millennium USA LP	8,609,917	190,140	8,800,057
Millennium Technology Value Partners II	(1,249,839)	(27,601)	(1,277,440)
Oaktree Real Estate Income Fund, LP	665,654	14,700	680,354
OCM Opportunities Fund VIIb, LP	(10,295)	(227)	(10,522)
OCM Opportunities Fund VIIIb, LP	1,514,504	33,446	1,547,950
OCM Power Opportunities Fund III, LP	(64,582)	(1,426)	(66,008)
Partners Group Direct Equity IV A, LP	2,578,566	56,945	2,635,511
Portfolio Advisors Secondary Fund IV, LP	1,263,513	27,903	1,291,416
Silver Creek Special Opportunities Fund I, LP	24,096	532	24,628
Silver Creek Special Opportunities Fund II, LP	38,724	855	39,579
Standard Investment Research Hedged Equity Fund	5,910,861	130,535	6,041,396
Smart Markets Fund, LP	573,932	12,675	586,607
TA Realty Core Property Fund, LP	807,121	17,824	824,945
Thomas H. Lee Partners LP	2,379,715	52,553	2,432,268
Voleon Institutional Strategies Fund LP	4,256,865	94,008	4,350,873
Voleon Investors Fund LP	1,231,523	27,197	1,258,720
Total investment management and incentive fees	129,285,045	2,855,114	132,140,159
Other investment fees			
<i>Investment consultant fees</i>			
Egan-Jones Ratings Company	8,806	194	9,000
Meketa Investment Group	277,433	6,100	283,533
NEPC	313,115	6,885	320,000
Verus Advisory, Inc.	259,298	5,702	265,000
Total investment consultant fees	858,652	18,881	877,533
<i>Investment custodial and other fees</i>			
BNY Mellon (custodial)	420,658	9,304	429,962
BNY Mellon (performance calculation)	187,927	4,156	192,083
Total investment custodial and other fees	608,585	13,460	622,045
Internal investment activity expenses	6,339,930	57,485	6,397,415
Total investing activity expenses	\$ 137,092,212	\$ 2,944,940	\$ 140,037,152

Schedule of Internal Investment Activity Expenses*For the Year Ended June 30, 2023*

Personnel services	
Salaries	\$ 2,085,317
Fringe benefits	918,527
Total personnel services	<u>3,003,844</u>
Professional services	
Attorney services	2,680,232
Total professional services	<u>2,680,232</u>
Communications	
Telephone	5,071
Total communications	<u>5,071</u>
Facilities	
Utilities	9,216
Lease expense	84,088
Facility maintenance	10,445
Total facilities	<u>103,749</u>
Software and equipment	
Computer supplies and software	182,489
Total software and equipment	<u>182,489</u>
Education, meetings, and travel	
Professional development including travel	18,584
Due diligence travel	14,894
Total education, meetings, and travel	<u>33,478</u>
General	
Research and information services	375,254
Membership dues	6,975
Office supplies	1,975
Periodicals and publications	4,143
Recruiting	205
Total general	<u>388,552</u>
Total internal investment activity expenses	<u>\$ 6,397,415</u>

Schedule of Administrative Expenses*For the Year Ended June 30, 2023*

Personnel services	
Salaries	\$ 5,600,425
Fringe benefits	2,926,933
Total personnel services	8,527,358
Professional services	
Consulting services	380,078
Attorney services	142,148
Auditing services	80,303
Actuarial services	163,306
Total professional services	765,835
Communications	
Postage and mailing	153,478
Telephone and internet	69,197
Printing	23,355
Video production	1,752
Total communications	247,782
Facilities	
Utilities	79,988
Facility maintenance	65,028
Vehicle maintenance and operation	3,736
Total facilities	148,752
Software and equipment	
Maintenance agreements and licenses	731,720
Computer supplies and software	73,354
Equipment rental	54,143
Gain on sale of equipment	(1,670)
Total software and equipment	857,547
Education, meetings, and travel	
Professional development including travel	92,524
Board travel and meetings	14,826
MOSERS sponsored seminars	74,021
Due diligence	1,119
Total education, meetings, and travel	182,490
General	
Depreciation and amortization	320,676
Insurance	215,709
Business continuity	75,159
Banking services	49,957
Research and information services	48,758
Office supplies and miscellaneous	73,903
Membership dues	26,365
Recruiting and outreach	15,454
Total general	825,981
Total administrative expenses	\$ 11,555,745

Schedule of Professional Service Fees*For the Year Ended June 30, 2023***Professional Services****Operations administrative expenses***Actuarial services*

Cavanaugh Macdonald Consulting, LLC	\$ 163,306
-------------------------------------	------------

Total actuarial services	163,306
---------------------------------	----------------

Attorney services

Ice Miller, LLP	72,360
-----------------	--------

Thompson Coburn, LLP	69,788
----------------------	--------

Total attorney services	142,148
--------------------------------	----------------

Auditing services

Eide Bailly, LLP	80,303
------------------	--------

Total auditing services	80,303
--------------------------------	---------------

Consulting services

CBIZ Talent and Compensation Solutions – human resources	22,650
--	--------

Charlesworth & Associates – risk management	13,044
---	--------

Election-America, Inc. – board election consulting	60,782
--	--------

Gamble & Schlemeier, Ltd. – governmental affairs	31,173
--	--------

Linea Solutions – information technology	239,979
--	---------

Metaformers, Inc. – information technology	6,300
--	-------

Other consulting services	6,150
---------------------------	-------

Total consulting services	380,078
----------------------------------	----------------

Total operations administrative expenses	765,835
---	----------------

Investment administrative expenses*Attorney services*

Bates White, LLC	17,982
------------------	--------

Cassels Brock & Blackwell, LLP	87,397
--------------------------------	--------

Froese Forensic Partners, Ltd.	10,718
--------------------------------	--------

Guru Discovery, LLC	30,079
---------------------	--------

Quinn Emanuel Urquhart & Sullivan, LLP	2,199,299
--	-----------

Thompson Coburn, LLP	330,792
----------------------	---------

Other attorney services	3,965
-------------------------	-------

Total attorney services	2,680,232
--------------------------------	------------------

Total investment administrative expenses	2,680,232
---	------------------

Total professional services expenses	\$ 3,446,067
---	---------------------

Information on investment management and consulting fees can be found in the Schedules of Investment Expenses on pages 60-61.

Capitalized professional service fees for the pension administration system*Consulting services*

ICON Integration and Design, Inc.	\$ 309,390
-----------------------------------	------------

Tegrit	385,000
--------	---------

Total consulting services	\$ 694,390
----------------------------------	-------------------



INVESTMENT SECTION

Assist in securing the financial security of generations of state employees by providing a lifetime of guaranteed pension benefits.

Chief Investment Officer's Report



PO Box 209, Jefferson City, MO 65102-0209
(573) 632-6100 • (800) 827-1063 | (573) 632-6103 (fax)
mosers@mosers.org (email)
Visit us at 907 Wildwood Drive or www.mosers.org

November 13, 2023

Dear Members,

I am pleased to present the *Investment Section* of the *MOSERS Annual Comprehensive Financial Report* for the fiscal year ended June 30, 2023. Over the last fiscal year, equity markets performed well in the face of continuous calls for a mild to moderate recession. Fixed income assets had negative returns given the Federal Reserve's (the Fed) material interest rate increases over the year. The Fed raised short-term interest rates by 4.25% over the year, negatively impacting most fixed income securities. Rest assured however, that the MOSERS portfolio is built to withstand all kinds of market uncertainties over time.

As long-term investors, MOSERS recognizes the importance of portfolio diversification and of maintaining those allocations in the portfolio over the long run. The total MOSERS portfolio generated a time-weighted rate of return of 2.5% for the fiscal year ended June 30, 2023, net of all fees and expenses.

While this result is disappointing on a nominal return basis, on a relative return basis, every asset class outperformed its benchmark and the portfolio in total exceeded the Board's 1.9% policy benchmark return expectation by about 0.6%. This resulted in over \$56 million of value added, above the policy benchmark, for this fiscal year. Total assets as of June 30, 2023, were approximately \$8.7 billion.

Specifically, the growth portion of the portfolio (which includes both public and private equity) rebounded nicely, returning 13.7%, versus a -12.7% return for the previous fiscal year while outperforming its benchmark by 0.2%. The absolute return portfolio also turned in strong nominal and relative performance for the fiscal year returning 6.8%, outperforming its benchmark of 4.6%.

Due primarily to their long interest rate duration positioning in a rising rate environment, both the inflation hedge and income allocations of the portfolio had negative nominal performance for the year, returning -5.6% and -7.0%, respectively. These allocations, however, did both exceed their benchmark returns of -5.7% and -7.4%, respectively.

Economies the world over continue to transition away from the historic impact of the pandemic environment and are having varying degrees of success in fighting the current higher inflation, higher interest rate, and lower-growth environments.

In the U.S., consumer spending appears to be slowing. However, with the unemployment rate near historic lows, consumer spending is slowing less than some have expected thus far. The personal savings rate is also lower than at almost any time in history. Both of these factors are contributing to a slowing, but still positive, growth trajectory in the U.S. Calls for a recession in the near term continue to abate, and economists are starting to debate the potential timing of the next interest rate reduction cycle.

I look forward to continuing work with the MOSERS Board and our highly talented, and experienced, investment staff to continue providing secure, reliable retirement benefits to all our plan members.

Sincerely,

TJ Carlson
Chief Investment Officer

Investment Policy Summary

The investment policy summary serves as a reference point for management of System assets and outlines MOSERS' investment philosophy and practices. Investments within this report are presented on the basis of fair value using a variety of sources such as appraisals, valuations of underlying companies and assets for limited partnerships and commingled funds, and through fair values obtained from the investment custodian.

The purpose of MOSERS' investment program is to ensure that MOSERS' members and beneficiaries receive their benefits at a reasonable and predictable cost to their employers. Plan assets may be invested, reinvested, and managed by MOSERS' investment staff or third-party investment managers, subject to the terms, conditions, and limitations provided by law and contracts, where applicable.

The MOSERS Board is charged with the responsibility for investing the assets of the System in a manner consistent with fiduciary standards set forth in the prudent person rule and has adopted the following objectives and philosophies to guide all investment related decisions.

Investment Objectives

- Develop a Real Return Objective (RRO) intended to keep contribution rates at a reasonable level over long periods of time, absent changes in actuarial assumptions.
- Establish an asset allocation policy that is expected to meet the RRO, while minimizing the impact of the portfolio investments' volatility on the contribution rate.
- Maximize long-term investment returns by exposing plan assets to a prudent level of risk in order to support the goal of having sufficient funds available to meet projected benefit payment obligations.
- Monitor costs associated with the efficient implementation of the asset allocation policy through the use of internal and external resources.

Investment Philosophy

- A key risk to the portfolio is asset shortfall where assets are insufficient to meet promised benefit obligations. As a result, the Board will strive to minimize the potential for long-term impact from disproportionate drawdowns.
- MOSERS is willing to take measured risks for which it expects to be compensated, and will seek to avoid risks, which may not be appropriately rewarded.
- The Board will employ a disciplined, objective, and quantitatively-driven asset/liability analysis process with the goal of determining the optimal asset allocation policy to meet the investment objectives.
- In order to meet the RRO, it is necessary for the Plan to maintain a significant allocation to growth (i.e., equity) assets. As a result, equity risk is expected to be the key contributor to the overall risk of the Plan's investments (Total Fund). In recognition of this, the Board's asset allocation policy will seek to mitigate the risk from large equity market declines.
- Strategic asset allocation is a significant factor influencing long-term investment performance and asset volatility. The asset allocation targets, determined by the Board, will be adhered to through clearly defined rebalancing guidelines.
- The Board will seek to cause the total fund to be broadly diversified in view of the fact that not all strategies will add value at all times, which should mitigate the impact of negative market environments over its long-term investment horizon.
- Risk management and performance benchmarking are integral to the investment program. The Board will establish and regularly monitor appropriate absolute and relative return risk as well as other key risks that affect the total fund.
- The Board recognizes the importance of benchmarking for monitoring how well investment decisions are fulfilling the Fund's objectives and will employ industry-accepted benchmarks for all asset classes and sub-asset classes for which the Board sets policy, using published market indices where feasible.
- Costs meaningfully impact investment returns and will be a consideration in all investment program decisions. Investment performance shall be reported net of fees to incorporate the full impact of fees and costs.

Roles and Responsibilities

Board of Trustees

The Board bears the ultimate fiduciary responsibility for the investment of System assets. Members of the Board must adhere to state law and prudent standards of diligence with respect to their duties as investment fiduciaries. Accordingly, they are required to discharge their duties in the interest of plan participants. They must also “act with the same care, skill, prudence, and diligence under prevailing circumstances that a prudent person, acting in a similar capacity and familiar with those matters, would use in the conduct of a similar enterprise with similar aims.”¹ Specifically related to investments, the Board is responsible for prudent oversight, governance, and management of the System’s assets.

Executive Director

The executive director is appointed by, and serves at the pleasure of, the Board. Pursuant to its authority to delegate functions to employees of the System under Section 104.1069, RSMo, the Board of Trustees has delegated to the executive director the responsibility to manage the staff that oversees and executes MOSERS’ investment program. The executive director selects, evaluates, and terminates the chief investment officer and is responsible for monitoring the investment program compliance, as established by policies set forth by the Board.

Chief Investment Officer (CIO) and Internal Staff

The CIO serves at the pleasure of the executive director and has primary responsibility for the overall direction of the investment program. The CIO works with the Board investment consultant and executive director in advising the Board on policies related to the investment program. The CIO has primary responsibility to make hiring and termination decisions related to money managers with the approval of the staff investment consultant. The CIO is also charged with the responsibility of making strategic allocation decisions within parameters established by Board policy. Other responsibilities of the CIO include monitoring the investment of System assets, oversight of external money managers and the internally managed portfolios, and keeping the Board apprised of situations that merit their attention. The internal investment staff is accountable to the CIO.

External Consultants

The Board investment consultant serves at the pleasure of the Board. The Board investment consultant’s primary duty is to provide the Board with independent and objective investment advice and assist the Board in making decisions and overseeing the investment program. Specifically, the Board investment consultant assists the Board in developing investment policy, recommends asset allocation policy as requested by the Board, and assists the Board in oversight of the investment program.

Staff investment consultants serve at the pleasure of the CIO. The primary responsibilities of the staff investment consultants are to provide independent and objective investment advice to the staff. Among other duties, as applicable, each staff investment consultant agrees in writing to the CIO’s proposed hiring or termination of external investment management firms and third-party plan administrators.

Chief Auditor

The chief auditor reports directly to the executive director and if, in the opinion of the chief auditor, circumstances warrant, may report directly to the Board. The chief auditor is independent of the System’s investment operations and, among other duties, is responsible for providing objective audit and review services for investment operations. It is the chief auditor’s objective to promote adequate and effective internal controls at a reasonable cost.

Master Custodian

BNY Mellon serves as the master custodian of the System’s assets except in cases where investments are held in partnerships, commingled accounts, or unique asset classes where it is impossible for them to do so. The master custodian is responsible for maintaining the official book of records, providing performance reports, and serving as an additional layer of risk control in the safekeeping of System assets.

¹ Section 105.688, RSMo - Investment Fiduciaries, Duties.

Asset Allocation

Determining the System's asset allocation is one of the most important decisions in the investment management process. The Board, with advice from the Board investment consultant and the CIO, adopted a new portfolio allocation in July 2018 that is designed to provide the highest probability of meeting or exceeding the System's investment objectives at a controlled level of risk and with liquidity that is acceptable to the Board. In determining the optimum mix of assets, the Board considers factors such as:

- The expected risk of each asset class.
- The expected rate of return for each asset class.
- The correlation between the rates of return of the asset classes.
- The investment objectives and risk constraints of the fund.
- The impact of the portfolio's volatility on the contribution rate.

While the Board maintains a set policy allocation mix, they have taken steps to provide flexibility by granting authority to the CIO to make strategic allocation decisions to capitalize on attractively valued opportunities within prudent risk constraints. This flexibility has allowed the System to take advantage of changing market conditions. The table below illustrates the policy asset allocation and ranges formally adopted by the Board for the new portfolio.

Asset Allocation

Asset Classes	Asset Allocation Policy	Asset Allocation Ranges ¹	Benchmark ²
Total growth	45%	35% - 55%	Blended
Global public equities	30%	15% - 45%	MSCI ACWI
Global private equities	15%	5% - 20%	Custom Private Equity Benchmark ³
Total income	35%	30% - 40%	Blended
Long treasuries	25%	20% - 30%	Bloomberg Long U.S. Treasury
Core bonds	10%	5% - 15%	Bloomberg U.S. Aggregate Bond
Total inflation hedge	40%	35% - 45%	Blended
Commodities	5%	0% - 10%	Bloomberg Commodity
TIPS	25%	20% - 30%	Bloomberg U.S. Treasury Inflation Notes 1 - 10 yr
Private real assets	5%	0% - 10%	NCREIF ODCE
Public real assets	5%	0% - 10%	FTSE NAREIT
Total absolute return	20%	15% - 25%	Blended
Hedge funds	5%	0% - 10%	HFRI FoF: Conservative + 0.70%
Alternative beta	10%	5% - 15%	HFRX Macro/CTA
Private credit	5%	0% - 10%	Morningstar LSTA U.S. Leveraged Loan + 2%

¹ The Board has granted the CIO the authority to operate within the risk allocation and policy asset allocation ranges.

² Benchmarks are net of MOSERS' actual leveraging costs on borrowed assets.

³ Custom Private Equity Benchmark is a weighted average roll-up of the underlying manager benchmarks which include State Street Private Equity Buyout Index, MSCI ACWI Index, and Legacy Private Equity Returns.

Rebalancing

It is the responsibility of staff to ensure that the asset allocation adheres to the System's rebalancing policy. MOSERS utilizes a combination of cash market and derivative transactions to maintain the total portfolio's allocation at the broad policy level. Reviews are conducted at least monthly to bring the portfolio back within allowable ranges of the broad policy targets.

Risk Controls

MOSERS' investment program faces numerous risks; however, the primary risk to MOSERS is that the assets will not support the liabilities over long periods of time. In order to control this risk and numerous other risks that face the System, the Board has taken the following steps, on an ongoing basis, to help protect the System:

- Actuarial valuations are performed each year to ensure the System is on track to meet the funding objectives of the plan. In addition, every five years an external audit of the actuary is conducted to ensure that the assumptions being made and calculation methods being utilized are resulting in properly computed liabilities.
- Asset/liability studies are conducted at least once every five years. The purpose of these studies is to ensure that the current portfolio design is structured to meet the System's liabilities. During these studies, investment expectations are also re-examined in more detail.
- An investment policy statement is in place to ensure that Board policies are clearly identified. Within these documents, desired outcomes are identified, responsibilities for individuals are identified in relation to particular areas of the portfolio's management, and details are provided for measuring outcomes. Reporting requirements are clearly identified to ensure appropriate checks and balances are in place. In addition, annual performance audits are conducted to ensure the performance measurement tools and methodologies being utilized are proper.

Performance Objectives and Monitoring Process

Generating a total nominal rate of return net of expenses of at least 6.95% is the primary performance objective for the total portfolio. This return objective is equal to the RRO plus expected inflation.

The reason for the long-term focus on this objective is to preclude the temptation to overreact to events in the marketplace that have no relevance in the management of the relationship between the System's assets and liabilities. The resulting dilemma is the conflicting need to evaluate investment policy implementation decisions over shorter time frames while maintaining the longer-term focus necessary to manage and measure the fund's performance relative to the RRO. To address this problem, the Board evaluates performance relative to policy benchmarks. This helps to evaluate the Board's broad policy decisions and the staff and external consultant's implementation decisions. Policy benchmarks measure broad investment opportunities of each sub-asset class in which MOSERS has chosen to invest. The difference between the policy benchmarks and the actual portfolio returns represent decisions made by the CIO to strategically deviate from the policy asset allocation for each sub-asset class.

The policy benchmarks are used in the following manner to evaluate Board and staff decisions:

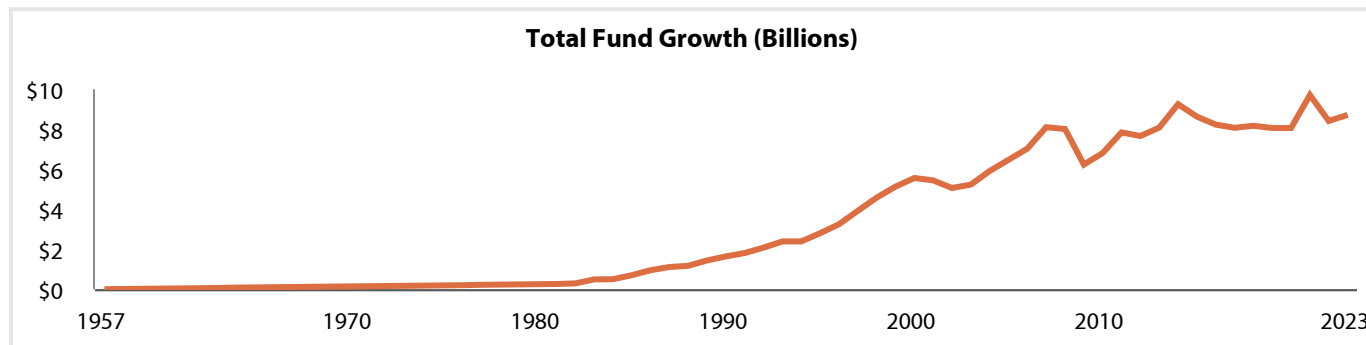
- **Board Decisions:** The value added through Board policy decisions is measured by the difference between the total fund policy benchmark return and the RRO. This difference captures the value added by the Board through their policy asset allocation decisions relative to the return necessary to fund the System's liabilities. A policy benchmark return greater than the RRO reflects the achievement of the RRO goals. A policy benchmark return less than the RRO reflects losses or shortfalls in performance in funding the liabilities. These policy decisions are measured over long periods of time.
- **CIO and External Consultants' Decisions:** There are two components to decisions made by the CIO and external consultants, which are monitored by the Board on an ongoing basis. They are: 1) strategic allocation decisions, and 2) implementation decisions.

Strategy decisions are made by the CIO to deviate from the policy benchmark weight. Implementation decisions are money manager selection choices made by the CIO with the agreement of the appropriate external consultant and the acknowledgement from the executive director that the decision was made in accordance with the Board's adopted policy. The value added through both strategic and implementation decisions is measured by the difference between the actual portfolio return and the policy benchmark return. An actual portfolio return greater than the policy benchmark return reflects value added through these decisions of the CIO and the external consultants. An actual portfolio return less than the policy benchmark return reflects losses to the fund's performance based upon these decisions. These CIO and external consultant decisions should be measured over all periods of time with a majority weight placed on outcomes that have occurred over a market cycle.

The Board reviews performance information on a quarterly basis to help ensure adequate monitoring of the fund's overall performance objectives.

Total Fund Review

As of June 30, 2023, the MOSERS investment portfolio had a fair value of \$8.7 billion. The graph below illustrates the growth of MOSERS' portfolio since the System's inception.



Investment Performance

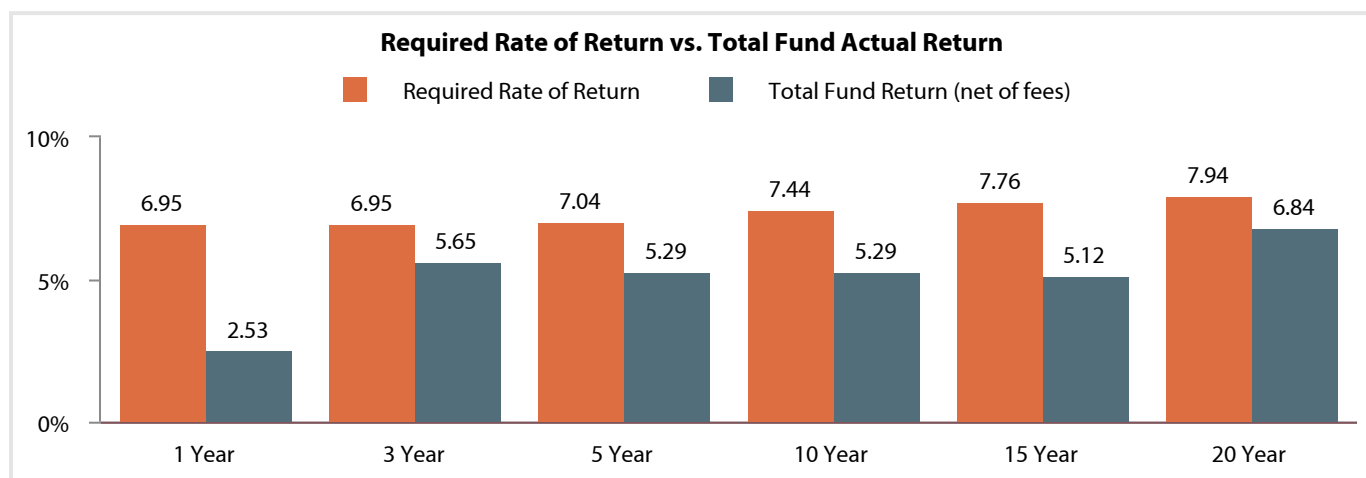
MOSERS' investments generated a time-weighted return of 2.5%, net of fees, for fiscal year 2023. The total fund return exceeded the 1-year policy benchmark of 1.9%. This additional 0.6% investment return produced \$56.2 million in excess of what would have been earned if the fund had been invested passively in the policy benchmark.

Investment Performance vs. Required Rate of Return

The total fund investment return is compared to a required rate of return. The required rate of return is established by the Board to determine how well the fund is performing over the long term in order to meet future plan obligations after accounting for inflation. The required rate of return for fiscal year 2023 is 6.95%.

Given the volatility of the investment markets, the portfolio should not be expected to meet the required rate of return every year. A review of long periods of time is best to evaluate whether or not the total return has kept pace with the System's funding objectives.

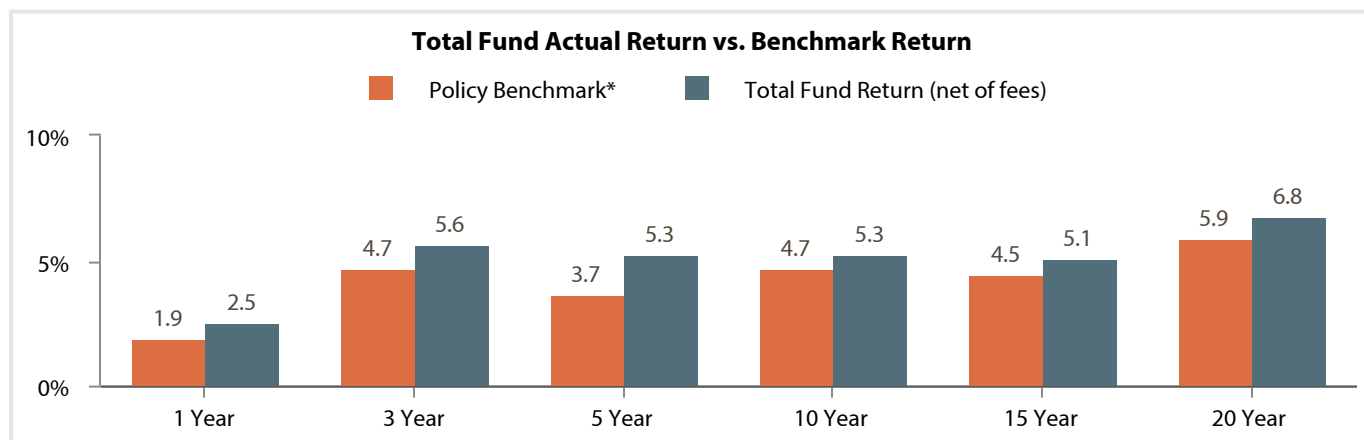
As indicated in the following bar chart, MOSERS' investment returns trailed the required rate of return by 1.1% over the 20-year period ended June 30, 2023.¹



¹ Performance returns are calculated using a time-weighted rate of return on fair values.

Investment Performance vs. Benchmark Comparisons

In addition to measuring performance relative to the required rate of return, the Board also compares fund returns to the policy benchmark. Returns for the total fund versus policy benchmarks are displayed in the following bar chart.



** As of June 30, 2023, the total fund policy benchmark was comprised of the following components: 45% total growth policy, 35% total income policy, 40% total inflation hedge policy and 20% total absolute return policy.*

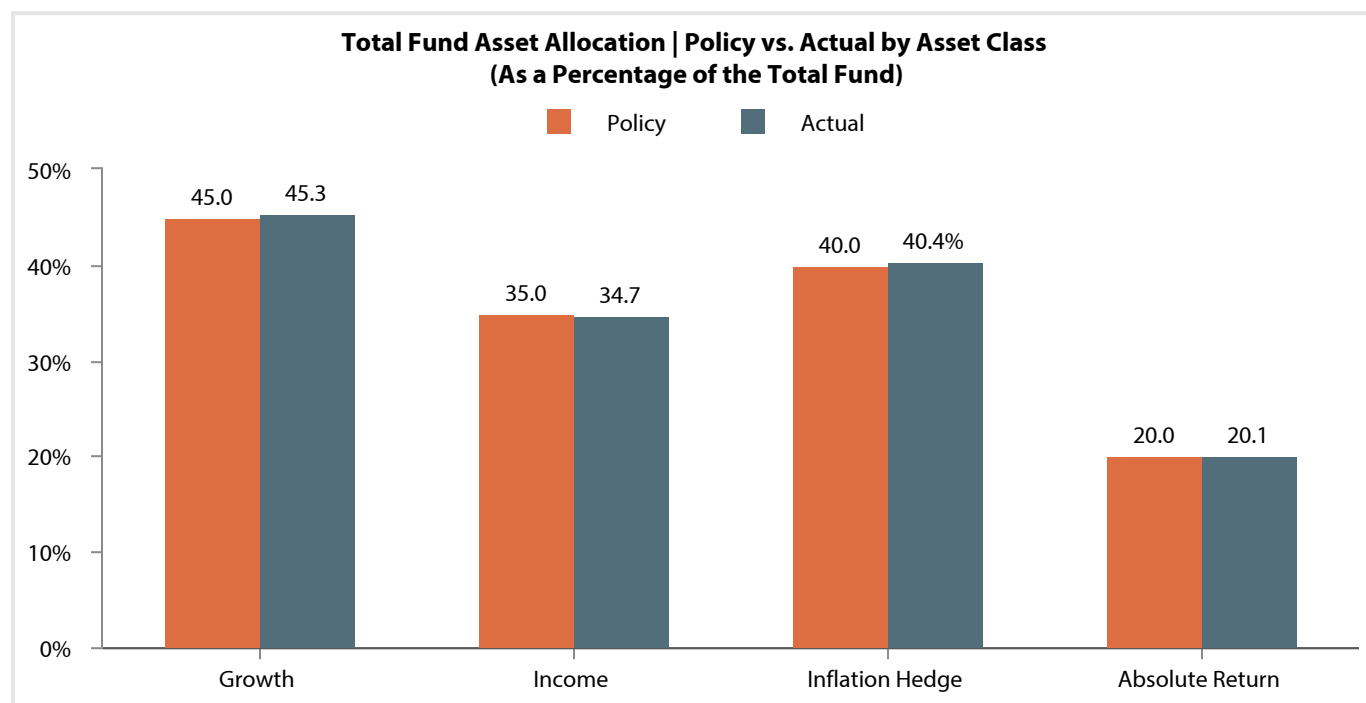
All policy return components are adjusted for financing costs associated with the program.

The policy benchmark provides an indication of the returns that could have been achieved (excluding transaction costs) by a portfolio invested in the designated benchmarks for each asset class at the percentage weights allocated to each asset class in MOSERS' policy asset allocation. Comparison of the total return to the policy benchmark reflects the total value added or detracted by the CIO through strategic and manager implementation decisions. Value is added when the total fund return exceeds the policy benchmark return. The total fund 1-, 3-, 5-, 10-, 15-, and 20-year actual performance outperformed its policy benchmark by 0.6%, 0.9%, 1.6%, 0.6%, 0.6%, and 0.9%, respectively.

Total Fund Policy Allocation Overview

As of June 30, 2023, the Board's broad policy allocation mix was 45% growth assets, 35% income assets, 40% inflation hedge assets, and 20% absolute return assets. The policy target, as of June 30, 2023, for each sub-asset class, along with the actual strategic allocation to each type of investment, is shown in the bar graph below.

The Board has granted authority to the CIO to make strategic decisions. A strategic decision should be thought of as any decision that might cause MOSERS' actual portfolio to differ from the policy asset allocation.



Schedule of Fees and Commissions

	Commissions Paid	Volume of Trades*	Shares Traded
Barclays Capital	\$ 3,234	\$ 28,855,544	646,733
BTIG, LLC	6,491	56,215,078	1,297,996
Citigroup Global Markets, Inc.	358	179,440	—
Credit Suisse	34	45,690	(1)
Jefferies & Co., Inc.	2,948	28,531,738	589,557
Morgan Stanley & Co., LLC	96,622	77,752,183	(1,198)
Total	\$ 109,687	\$ 191,579,673	\$ 2,533,087

* Volume does not include futures notional value.

Schedule of Investment Portfolios by Asset Class

As of June 30, 2023

	Portfolio Value	Percentage of Portfolio	Market Exposure	Percentage of Investments at Market Exposure
Growth	\$ 3,952,118,840	45.3%	\$ 3,951,986,999	45.4%
Income	1,538,840,923	17.7	3,023,772,994	34.7
Inflation hedge	1,467,882,502	16.9	3,516,474,491	40.4
Absolute return	1,750,789,042	20.1	1,750,789,320	20.1
Total portfolio	8,709,631,307	100.0	12,243,023,804	140.6
Residual accounts	5,610,759	0.1	5,610,759	0.1
Cash reserve	759,302	0.0	759,302	0.0
MOSERS Total Fund	\$ 8,716,001,368	100.0%	\$ 12,249,393,865	140.6%
<i>Reconciliation to Statement of Fiduciary Net Position</i>				
Total fund value	\$ 8,716,001,368			
Obligations under repurchase agreements	3,603,920,038			
Receivable - investment income	(580,579,237)			
Receivable - investment sales	(191,763,748)			
Investment activities payable	581,523,664			
Management and incentive fee payable	1,167,159			
Payable for investments purchased	77,176,334			
Investments per <i>Statement of Fiduciary Net Position</i>	\$ 12,207,445,578			

Total Fund – Top Ten Publicly Traded Separate Account Holdings

Ten Largest Holdings as of June 30, 2023*		Fair Value	Percent of the Total Fund
U.S. Treasury Bond CPI Inflation - 1.125% 2033	\$	92,984,258	1.07%
U.S. Treasury Bond CPI Inflation - 0.625% 2032		90,743,444	1.04
U.S. Treasury Bond CPI Inflation - 0.125% 2027		90,236,861	1.04
U.S. Treasury Bond CPI Inflation - 0.375% 2025		86,592,674	0.99
U.S. Treasury Bond CPI Inflation - 0.125% 2024		83,397,143	0.95
U.S. Treasury Bond CPI Inflation - 1.625% 2027		80,549,592	0.92
U.S. Treasury Bond CPI Inflation - 0.125% 2031		80,148,917	0.92
U.S. Treasury Bond CPI Inflation - 0.250% 2025		80,079,829	0.92
U.S. Treasury Bond CPI Inflation - 0.125% 2024		77,704,407	0.89
U.S. Treasury Bond CPI Inflation - 0.375% 2027		77,560,330	0.89

* For a complete list of holdings, contact MOSERS.

Schedule of Investment Results

1-, 3-, 5-, 10-, 15-, and 20-Year Periods

Total fund – As of June 30, 2023, the total fund policy benchmark was comprised of the following components: 45% total growth policy, 35% total income policy, 40% total inflation hedge policy, and 20% total absolute return policy. This program did not begin until January 2019.

Growth – As of June 30, 2023, the total growth policy was 66.7% global public equities policy benchmark and 33.3% global private equities policy benchmark.

- Global public equities policy - As of June 30, 2023, the total global public equities policy was MSCI All Country World Index (ACWI).
- Global private equities policy - As of June 30, 2023, the global private equities policy benchmark was a blend of 29.0% MOSERS legacy private equity return/35.4% State Street Buyout Index (weighted by vintage year)/35.6% MSCI ACWI Index.

Income – As of June 30, 2023, the total income policy was 71.4% long treasury policy benchmark and 28.6% core bonds policy benchmark.

- Long treasuries - As of June 30, 2023, the long treasuries policy was Bloomberg U.S. Long Treasury Index.
- Core bonds - As of June 30, 2023, the core bonds policy was Bloomberg U.S. Aggregate Bond Index.

Inflation hedge – As of June 30, 2023, the total inflation hedge policy was 12.5% commodities policy benchmark, 62.5% TIPS policy benchmark, 12.5% private real assets policy benchmark, and 12.5% public real assets policy benchmark.

- Commodities - As of June 30, 2023, the commodities policy was Bloomberg Commodity Index.
- Treasury inflation protected securities (TIPS) - As of June 30, 2023, the TIPS policy was the Bloomberg U.S. Treasury Inflation Notes 1 - 10 yr Index.
- Private real assets - As of June 30, 2023, the private real assets policy benchmark was NCREIF Fund Index - Open End Diversified Core Equity (ODCE).
- Public real assets - As of June 30, 2023, the public real assets policy was FTSE NAREIT ALL REITS Index.

Absolute return – As of June 30, 2023, the absolute return policy benchmark was comprised of 25.0% direct hedge funds policy benchmark, 50.0% alternative beta - beta policy benchmark, and 25.0% private credit policy benchmark.

- Alternative beta - As of June 30, 2023, the alternative beta policy was HFRX Macro/CTA Index.
- Hedge funds - As of June 30, 2023, the hedge funds policy benchmark was the HFRI Fund of Funds: Conservative Index + 0.70%.
- Private credit - As of June 30, 2023, the private credit policy was Morningstar LSTA U.S. Leveraged Loan + 2%.

Schedule of Investment Results (continued)

	1 Year	3 Year	5 Year	10 Year	15 Year	20 Year
Total fund	2.5%	5.6%	5.3%	5.3%	5.1%	6.8%
<i>Total fund policy benchmark</i>	1.9%	4.7%	3.7%	4.7%	4.5%	5.9%
Growth	13.7%	12.9%	N/A	N/A	N/A	N/A
<i>Growth policy benchmark</i>	13.5%	13.3%	N/A	N/A	N/A	N/A
Global public equities	18.5%	12.2%	6.8%	8.2%	7.3%	9.0%
<i>Global public equities policy benchmark</i>	16.8%	11.2%	8.2%	8.9%	6.7%	8.0%
Global private equities	4.3%	15.7%	N/A	N/A	N/A	N/A
<i>Global private equities policy benchmark</i>	6.8%	15.8%	N/A	N/A	N/A	N/A
Income	(7.0)%	(10.1)%	N/A	N/A	N/A	N/A
<i>Income policy benchmark</i>	(7.4)%	(10.6)%	N/A	N/A	N/A	N/A
Long treasuries	(9.8)%	(12.9)%	(2.0)%	1.0%	N/A	N/A
<i>Long treasuries policy benchmark</i>	(9.9)%	(13.2)%	(2.3)%	0.8%	N/A	N/A
Core bonds	0.2%	(2.7)%	N/A	N/A	N/A	N/A
<i>Core bonds policy benchmark</i>	(0.9)%	(4.0)%	N/A	N/A	N/A	N/A
Inflation hedge	(5.6)%	4.6%	N/A	N/A	N/A	N/A
<i>Inflation hedge policy benchmark</i>	(5.7)%	3.7%	N/A	N/A	N/A	N/A
Commodities	(13.0)%	16.0%	3.3%	(4.8)%	(6.8)%	(0.3)%
<i>Commodities policy benchmark</i>	(13.4)%	15.9%	2.7%	(4.6)%	(8.3)%	(1.6)%
Inflation-indexed bonds	(3.9)%	0.0%	1.2%	0.9%	2.2%	3.3%
<i>Inflation-indexed bonds policy benchmark</i>	(3.8)%	0.0%	1.3%	1.0%	2.2%	3.3%
Private real assets	(7.7)%	13.5%	N/A	N/A	N/A	N/A
<i>Private real assets policy benchmark</i>	(10.7)%	5.6%	N/A	N/A	N/A	N/A
Public real assets	(4.2)%	6.2%	N/A	N/A	N/A	N/A
<i>Public real assets policy benchmark</i>	(4.3)%	6.2%	N/A	N/A	N/A	N/A
Absolute return	6.8%	8.0%	N/A	N/A	N/A	N/A
<i>Absolute return policy benchmark</i>	4.6%	6.0%	N/A	N/A	N/A	N/A
Hedge funds	6.9%	9.7%	N/A	N/A	N/A	N/A
<i>Hedge funds policy benchmark</i>	4.3%	10.3%	N/A	N/A	N/A	N/A
Alternative beta	3.8%	6.3%	1.7%	3.2%	N/A	N/A
<i>Alternative beta policy benchmark</i>	0.7%	2.7%	(3.2)%	(0.4)%	N/A	N/A
Private credit	12.9%	9.8%	N/A	N/A	N/A	N/A
<i>Private credit policy benchmark</i>	12.7%	8.3%	N/A	N/A	N/A	N/A

Results are based on time-weighted rates of return on fair values adjusted for cash flows. Where applicable, benchmarks are calculated net of financing costs.

Broad asset allocations (Growth, Income, Inflation Hedge, and Absolute Return) were established with the asset allocation adopted by the Board in 2018. Therefore, 5-, 10-, 15-, and 20-Year returns are not available yet as of June 30, 2023.

Schedule of Investment Manager Fees

For the Year Ended June 30, 2023

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses *	Incentive Fees Earned
Equity					
Artisan International Value Fund	337,667,473	3,204,058	3,103,931	100,127	0
Baillie Gifford Intl. Alpha Private Equity	222,999,727	1,138,765	929,421	209,344	0
Baillie Gifford EM Private Equity	86,001,622	713,428	573,763	139,665	0
NS Partners Emerging Markets	173,676,108	1,479,766	1,197,061	282,705	0
Silchester International Investors	345,225,099	2,053,535	2,053,535	0	0
Total equity	1,165,570,029	8,589,552	7,857,711	731,841	0
Multi-asset					
Blackrock	321,679,571	1,274,370	576,850	697,520	0
NISA Investment Advisors	1,665,369,971	5,124,746	5,124,746	0	0
Total multi-asset	1,987,049,542	6,399,116	5,701,596	697,520	0
Alternatives					
ABRDN Eclipse HFRX Macro/CTA SPC	343,350,057	1,666,587	644,957	1,021,630	0
Aberdeen Davi Alpha	160,917,250	728,168	920,884	(192,716)	0
Actis Emerging Markets 3	476,000	(357,000)	0	(357,000)	0
Actis Emerging Markets 4	21,466,872	(3,888,098)	448,070	16,832	(4,353,000)
Altas Partners Holdings III LP	136,255	9,072	(331,507)	340,579	0
Appian Natural Resources Fund III	3,082,340	424,330	369,863	54,467	0
Axiom Asia Private Capital Fund II, LP	15,356,303	138,743	167,882	32,621	(61,760)
Axiom Asia Private Capital Fund III, LP	72,812,697	763,867	287,867	41,863	434,137
Axiom Asia Fund 6, LP	22,267,318	584,422	500,000	103,571	(19,149)
Axxon Brazil Private Equity Fund II B, LP	8,923,281	156,537	117,051	39,486	0
Blackstone Real Estate Partners IV	854,091	42,912	0	73,584	(30,672)
Blackstone Real Estate Partners V	111,516	56,478	0	6,747	49,731
Blackstone Real Estate Partners VI	1,091,731	(104,779)	0	16,176	(120,955)
Blackstone Real Estate Partners VII	13,136,857	(273,740)	9,440	(283,180)	0
Blackstone Topaz Fund, LP	362,736,787	3,990,021	2,718,044	336,642	935,335
Blackstone Topaz Private Credit	267,780,476	2,175,020	1,623,375	199,415	352,230
Blue Diamond Non-Directional Fund	83,397,143	2,649,993	696,302	40,181	1,913,510
Brevan Howard Alpha Strategies Fund, LP	229,943,789	20,366,311	2,411,304	10,196,244	7,758,763
Catalyst Fund Limited Partnership III	13,673,581	225,542	186,317	39,225	0
Catalyst Fund Limited Partnership IV	2,642,705	75,610	55,989	19,621	0
Catalyst Fund Limited Partnership V	62,900,265	1,905,500	1,977,504	(72,004)	0
CBRE U.S. Core Partners, LP	129,627,586	1,586,985	1,254,971	168,328	163,686
Centiva Capital	130,277,647	5,854,134	0	3,285,524	2,568,610
Cornwall Domestic, LP	1,386,798	28,433	0	28,433	0
DE Shaw Dioptr Fund, LLC	71,976,667	1,077,554	355,267	57,565	664,722
EIG Energy Fund XIV, LP	1,791,474	103,349	0	103,349	0
EIG Energy Fund XV, LP	5,859,113	96,752	9,213	87,539	0
EIG Energy Fund XVI, LP	22,287,258	283,045	238,167	44,878	0
EIG Co-Investment	241,881	33,340	0	33,340	0

Schedule of Investment Manager Fees continued on following page

Schedule of Investment Manager Fees (continued)

For the Year Ended June 30, 2023

	Portfolio Fair Value	Total Fees	Manager Fees	Fund Pass Through Expenses*	Incentive Fees Earned
Eisler Multi-Strategy Fund, LP	187,797,113	16,204,297	137,932	4,709,359	11,357,006
Elliott International Limited	260,338,858	6,981,087	3,862,634	1,513,181	1,605,272
Exodus Point Partners Fund	157,192,971	13,199,783	0	4,349,977	8,849,806
Farallon Capital Institutional Partners, LP	576,332	(8,977)	0	0	(8,977)
Gateway Energy & Resource Holdings, LLC	3,405,084	17,737	0	17,737	0
Global Forest Partners GTI7					
Institutional Investors Company Ltd.	443,002	5,285	2,282	3,003	0
Gryphon Partners VI, LP	81,342,069	(474,356)	(80,000)	256,276	(650,632)
Harrison Street Real Estate Core Property Fund, LP	59,438,348	1,068,011	806,766	261,245	0
HBK Merger Strategies Offshore Fund, Ltd.	105,580,732	4,100,219	1,177,353	289,872	2,632,994
HIG Middle Mkt LBO Fund IV, LP	709,677	1,110,402	872,283	238,119	0
JLL Partners Fund V, LP	2,988,096	(159,825)	0	6,023	(165,848)
JLL Partners Fund VI, LP	1,277,841	(44,340)	0	15,026	(59,366)
King Street Capital, LP	868,642	184,679	13,072	0	171,607
LaSalle Property Fund	79,546,638	831,981	771,985	59,996	0
Linden Capital Partners II, LP	13,465,520	(1,125,434)	0	21,054	(1,146,488)
Mercato Partners Traverse IV, LP	22,940,696	3,217,372	2,312,742	702,506	202,124
Merit Energy Partners F-II, LP	1,538,759	11,847	9,983	1,864	0
MHR Institutional Partners IIA, LP	8,556,807	(735,642)	0	18,747	(754,389)
MHR Institutional Partners III, LP	13,574,043	37,063	0	37,063	0
MHR Institutional Partners IV, LP	65,468,279	3,170,880	654,867	237,668	2,278,345
Millennium USA LP	9,329,190	8,800,057	0	7,625,378	1,174,679
Millennium Technology Value Partners II	11,641,964	(1,277,440)	259,078	25,294	(1,561,812)
Oaktree Real Estate Income Fund, LP	50,894,452	680,354	411,472	268,882	0
OCM Opportunities Fund VIIb, LP	38,857	(10,522)	0	(15,089)	4,567
OCM Opportunities Fund VIIIb, LP	8,624,087	1,547,950	52,396	13,038	1,482,516
OCM Power Opportunities Fund III, LP	152,953	(66,008)	0	9,543	(75,551)
Partners Group Direct Equity IV A, LP	78,799,982	2,635,511	1,860,069	317,412	458,030
Portfolio Advisors Secondary Fund IV, LP	142,593,213	1,291,416	1,530,843	31,727	(271,154)
Silver Creek Special Opportunities Fund I, LP	2,717,654	24,628	0	24,628	0
Silver Creek Special Opportunities Fund II, LP	5,361,455	39,579	0	39,579	0
Standard Investment Research Hedged Equity Fund	172,703,442	6,041,396	3,364,563	201,715	2,475,118
Smart Markets Fund, LP	50,852,104	586,607	520,657	65,950	0
TA Realty Core Property Fund, LP	90,676,239	824,945	674,170	150,775	0
Thomas H. Lee Partners LP	40,829,155	2,432,268	1,499,999	1,101,846	(169,577)
Voleon Institutional Strategies Fund LP	68,098,594	4,350,873	1,254,352	438,534	2,657,987
Voleon Investors Fund LP	21,582,682	1,258,720	393,789	134,628	730,303
Total alternatives	3,872,451,268	117,151,491	37,024,247	38,655,496	41,471,748
Total fees	7,025,070,839	132,140,159	50,583,554	40,084,857	41,471,748

* Fund pass through expenses are administrative expenses charged to the fund and paid by the limited partners (including MOSERS), in addition or in lieu of management fees and incentive fees. These expenses may include, but are not limited to, accounting, audit, legal, and custody expenses directly related to the administration of the underlying fund investments and pass through management fees and incentive fees.

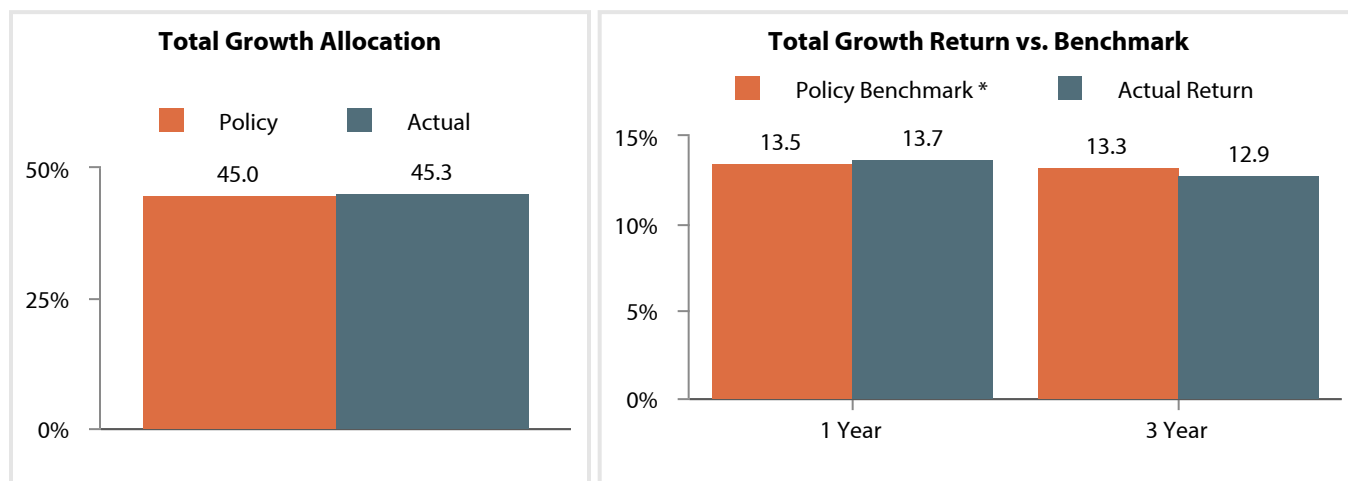
Asset Class Summary

The portfolio consists of four broad investment allocations: growth, income, inflation hedge, and absolute return. Each of these allocations are made up of a number of different sub-asset classes. Two of the four allocations had positive performance during the fiscal year. The growth allocation return was 13.7%, and the income allocation returned (7.0)%. The inflation hedge allocation return was (5.6)% and the absolute return allocation returned 6.8%.

Growth Allocation

The growth allocation is designed to provide capital appreciation by accessing both an equity risk premium and a liquidity risk premium. In addition, it is expected that investments in this category would perform well in periods of rising economic growth. Investments in this allocation include U.S. and non-U.S. equity investments with varying characteristics related to market capitalization and investment style. Because of the non-U.S. nature of some of these investments, this allocation is subject to some foreign currency exposure. The growth allocation is made up of global public equities and global private equities.

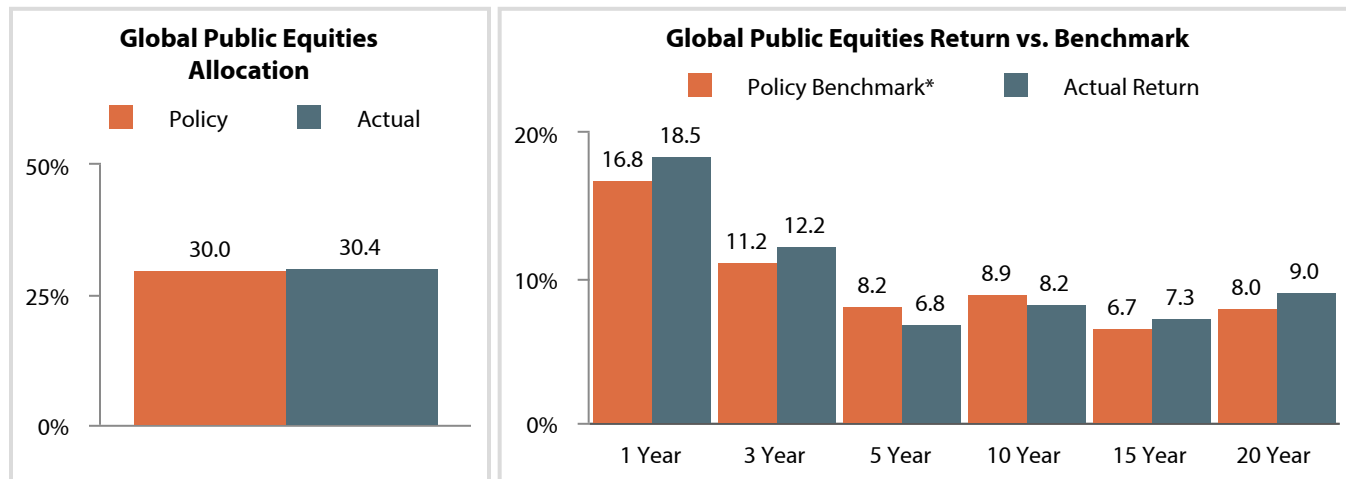
The market exposure of the growth allocation on June 30, 2023, was \$3.95 billion, representing 45.3% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the growth allocation returned 13.7% versus 13.5% for the policy benchmark. This outperformance was the result of manager implementation that outperformed the benchmark. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.



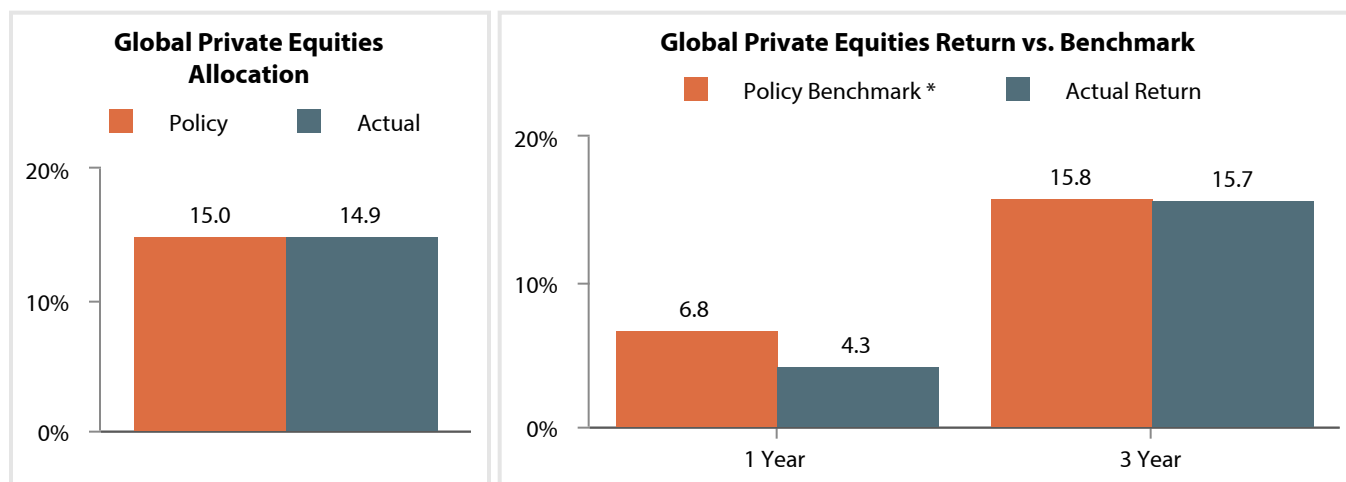
* As of June 30, 2023, the total growth policy benchmark was comprised of 66.7% global public equities policy benchmark and 33.3% global private equities policy benchmark.

Investment Section

For the fiscal year, public equities returned 18.5% versus 16.8% for the policy benchmark. This outperformance was the result of manager implementation that outperformed the benchmark. Private equities, for the fiscal year, returned 4.3% compared to its policy benchmark return of 6.8%. This underperformance was the result of manager implementation that underperformed the benchmark.



* As of June 30, 2023, the global public equities policy benchmark was MSCI All Country World Index (ACWI).

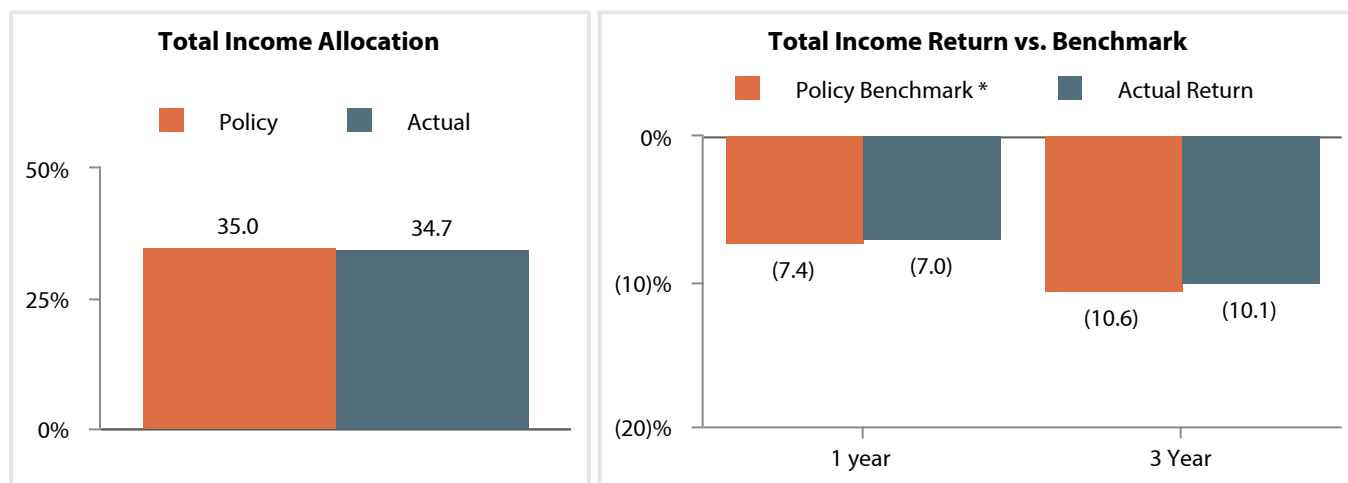


* As of June 30, 2023, the global private equities policy benchmark was a blend of 29.0% MOSERS legacy private equity return/ 35.4% State Street Buyout Index (weighted by vintage year)/ 35.6% MSCI ACWI Index.

Income Allocation

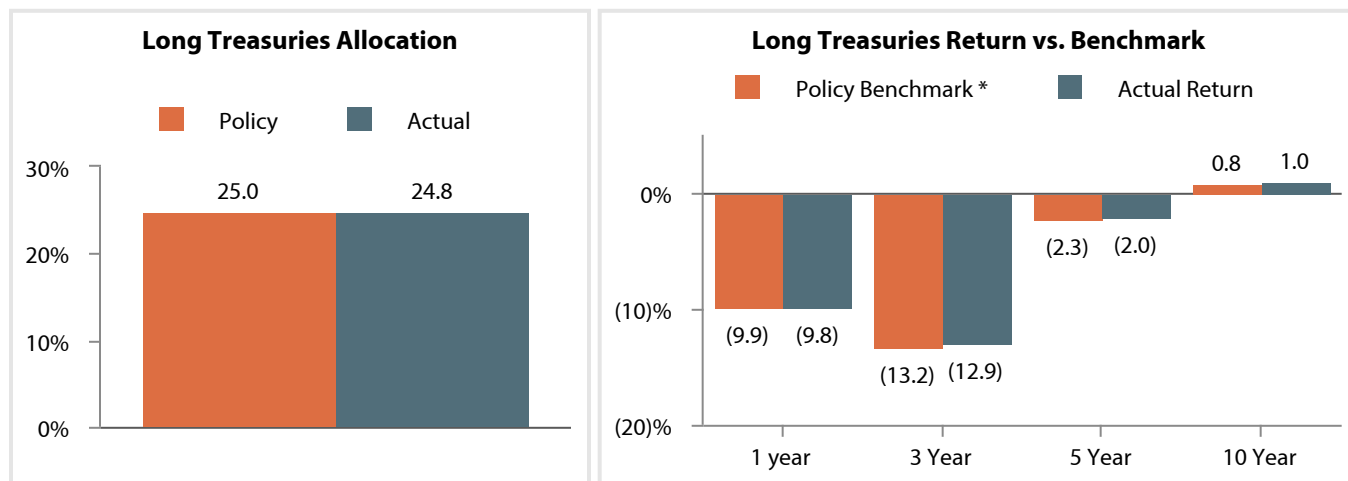
This allocation is designed to provide a source of current income and to reduce overall fund volatility. It is expected that investments in this asset class will perform well in periods of stable or falling economic growth and falling inflation. Investments in this asset class include U.S. bonds that have been issued, collateralized, or guaranteed by the U.S. Government, its agencies, or its instrumentalities. Core bonds may also include debt issued by corporations, or securitized debt. Because this asset class is invested in all U.S. bonds, there is currently not any foreign currency exposure as part of this allocation.

As of June 30, 2023, the market exposure of the income allocation was \$3.02 billion, representing 34.7% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the income allocation returned (7.0)% as compared to (7.4)% for the income allocation policy benchmark. The outperformance was mainly driven by core bonds that outperformed the policy benchmark by 1.1%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.

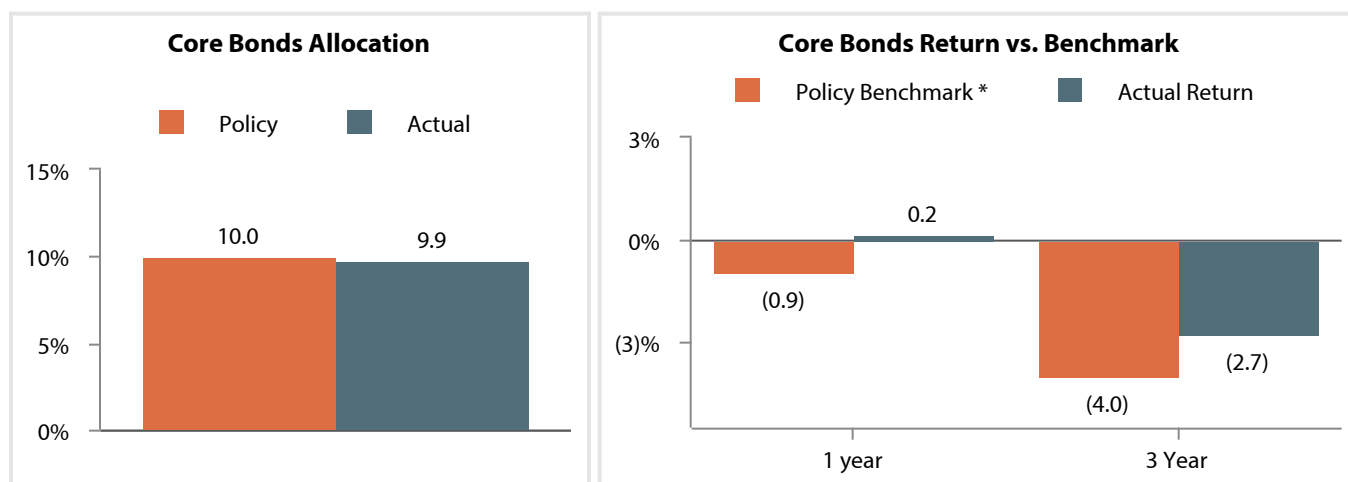


* As of June 30, 2023, the total income policy benchmark was comprised of 71.4% long treasury policy benchmark and 28.6% core bonds policy benchmark.

For the fiscal year, long treasuries returned (9.8)% versus (9.9)% for the policy benchmark. The exposure to long treasuries is gained passively with minimal tracking error. Core bonds, for the fiscal year, returned 0.2% compared to its policy benchmark return of (0.9)%. This outperformance was the result of manager implementation that outperformed the benchmark.



* As of June 30, 2023, the long treasuries policy benchmark was Bloomberg U.S. Long Treasury Index.

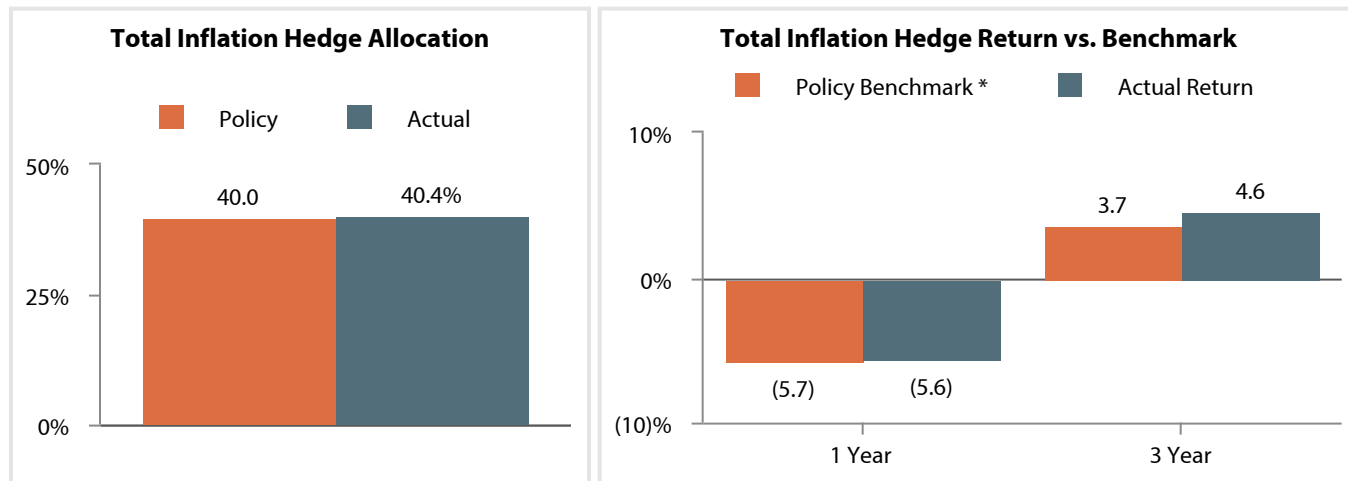


* As of June 30, 2023, the core bonds strategy benchmark was Bloomberg U.S. Aggregate Bond Index.

Inflation Hedge Allocation

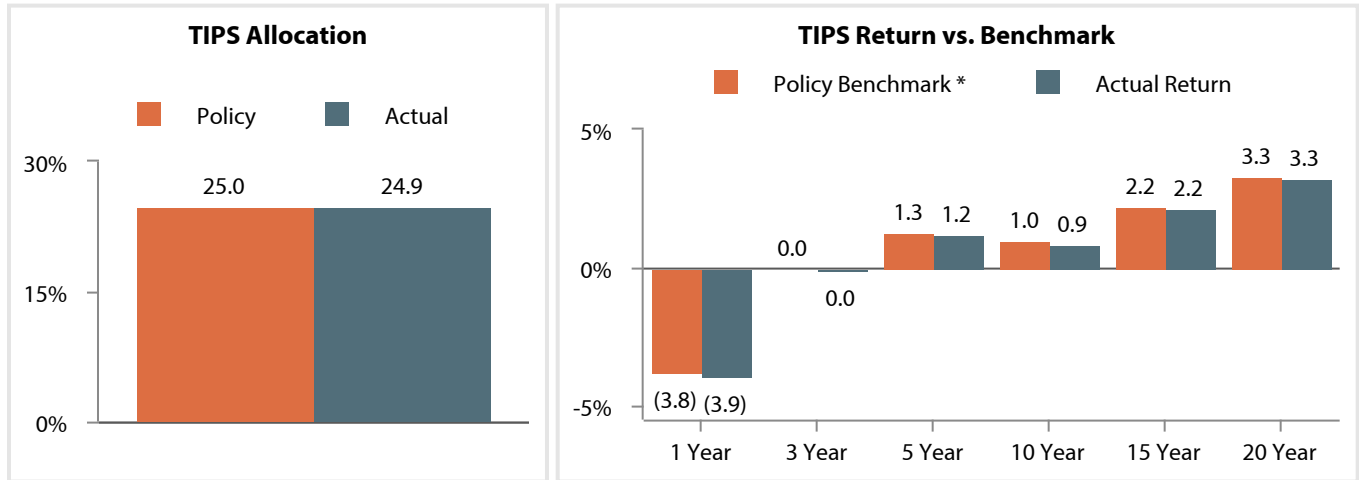
It is expected that investments in this asset class will perform well during periods of rising inflation. Investments in this asset class include U.S. Government treasury inflation protected securities (TIPS), commodities, private real assets, and public real assets. TIPS are designed to provide a source of current income and protect against actual inflation. It is expected that investments in this asset class will perform well during periods of falling economic growth and rising inflation. Commodities are designed to provide protection from an unexpected rise in inflation. In addition, it is expected that investments in this category would perform well in periods of rising economic growth. Private real assets are designed to provide capital appreciation and income and provide access to a form of equity risk premium and liquidity risk premium. It is expected that investments in this category would perform well in periods of rising economic growth and rising inflation. Public real assets are designed to provide capital appreciation and income and provide access to a form of equity risk premium. In addition, it is expected that investments in this category would perform well in periods of rising economic growth and rising inflation. Because this asset class is invested primarily in U.S. denominated assets, there is not expected to be meaningful foreign currency exposure as part of this allocation.

As of June 30, 2023, the market exposure of the inflation hedge allocation was \$3.52 billion representing 40.4% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. For the fiscal year, the inflation hedge allocation returned (5.6)% versus (5.7)% for the policy benchmark. The outperformance was mainly driven by private real assets that outperformed the policy benchmark by 3%. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.

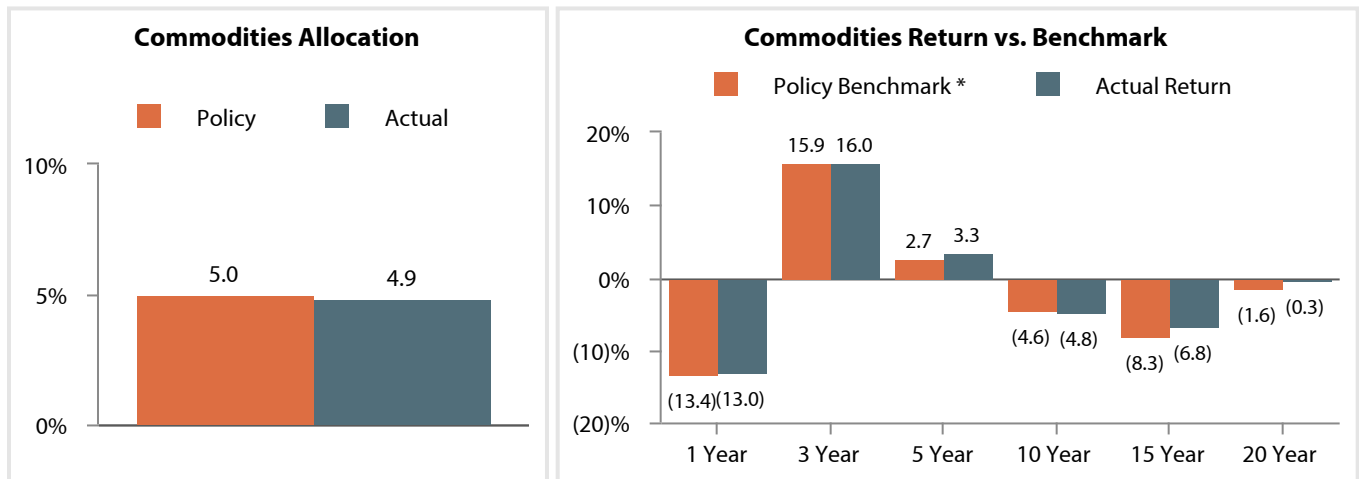


* As of June 30, 2023, 12.5% commodities policy benchmark, 62.5% TIPS policy benchmark, 12.5% private real assets policy benchmark, and 12.5% public real assets policy benchmark.

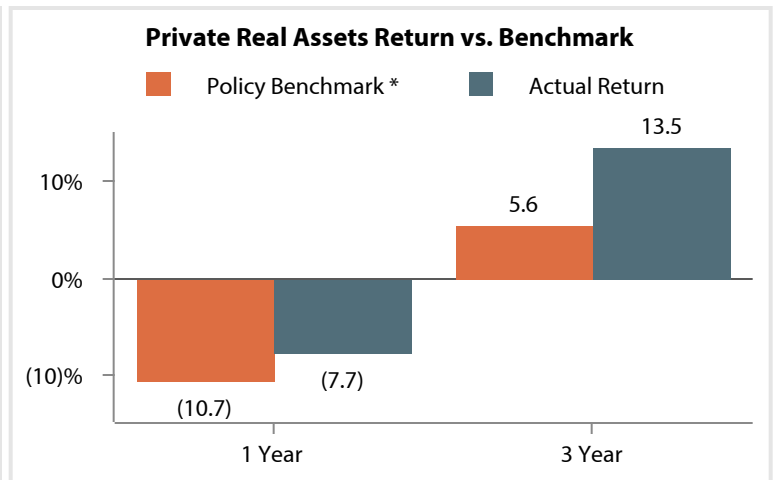
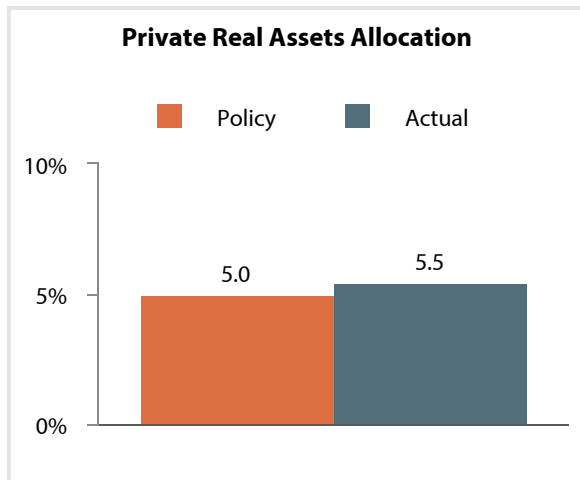
For the fiscal year, TIPS returned (3.9)% versus (3.8)% for the policy benchmark. There was no internal or external active management strategy utilized during the fiscal year; thus, providing a return that closely matched the benchmark. Commodities, for the fiscal year, returned (13.0)% compared to its policy benchmark return of (13.4)% providing a return similar to the benchmark. Public real assets returned (4.2)% for the fiscal year, compared to its policy benchmark return of (4.3)%. There was no internal or external active management strategy utilized during the fiscal year; thus, providing a return that closely matched the benchmark. For the fiscal year, private real assets returned (7.7)% versus (10.7)% for its policy benchmark. This outperformance was the result of manager implementation that outperformed the benchmark.



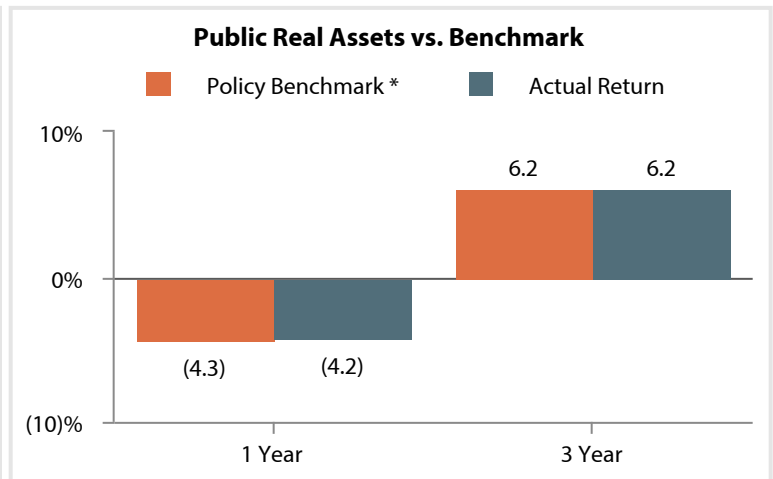
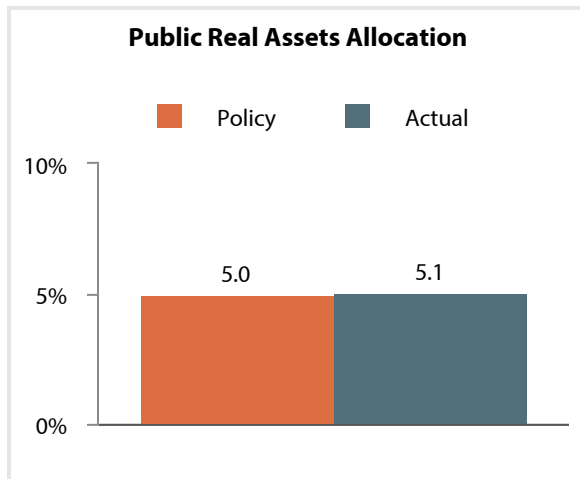
* As of June 30, 2023, the TIPS policy benchmark was the Bloomberg U.S. Treasury Inflation Notes 1 - 10 yr Index.



* As of June 30, 2023, the commodities policy benchmark was the Bloomberg Commodity Index.



* As of June 30, 2023, the private real assets policy benchmark was NCREIF Fund Index - Open End Diversified Core Equity (ODCE).



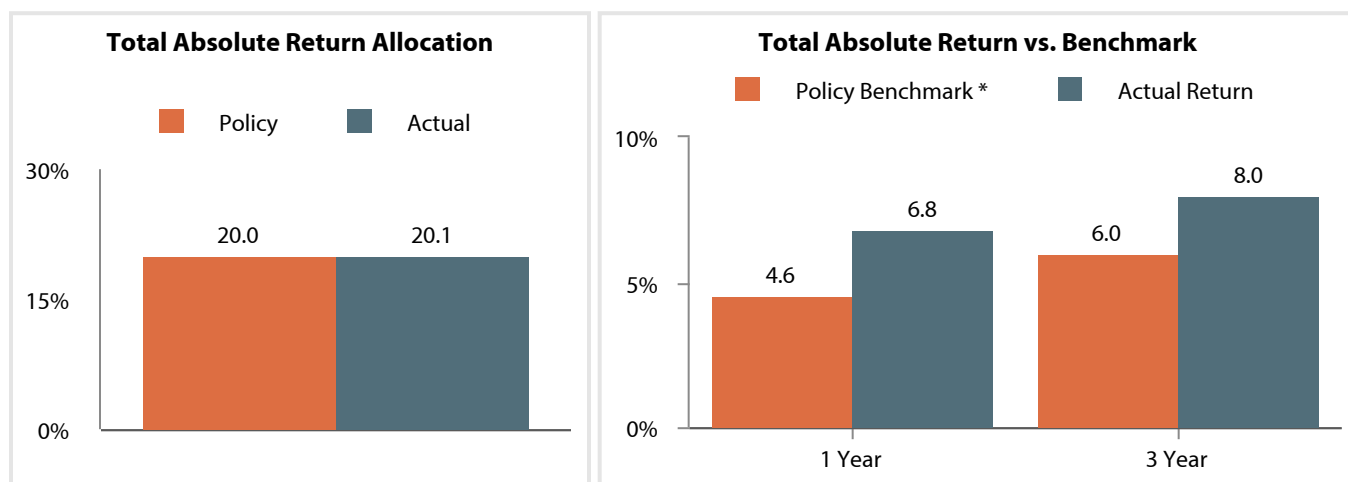
* As of June 30, 2023, the public real assets policy benchmark was the FTSE NAREIT ALL REITS Index.

Absolute Return Allocation

This asset class represents alternative betas, hedge funds, and private credit. Alternative betas and hedge funds are designed to provide a source of stable returns and low correlations with traditional asset strategies. In addition, it is expected that investments in this category would perform well across multiple economic environments. Private credit is designed to provide a source of current income and provide access to a form of credit risk premium. It is expected that investments in this category would perform well in periods of rising economic growth.

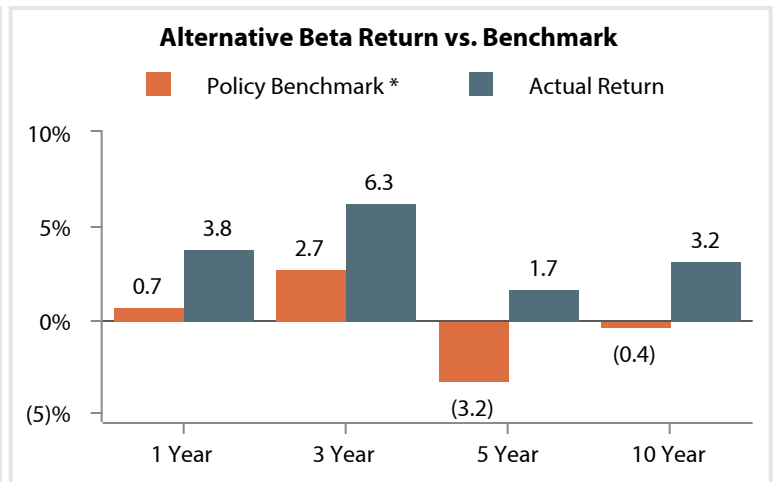
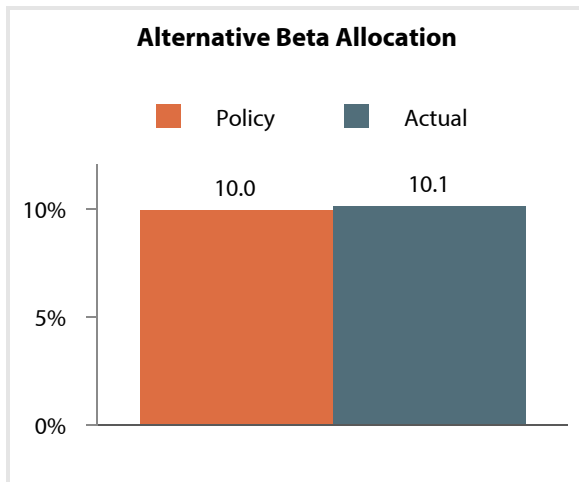
As a result of the multitude of strategies being deployed, it is expected that this asset class will provide meaningful diversification to the portfolio. While the sensitivities to economics will be dependent on positioning at the time, it is expected that these betas will have their best returns in rising growth environments and their worst returns in falling growth environments. Because of the non-U.S. nature of some of these investments, this allocation is subject to some foreign currency exposure.

As of June 30, 2023, the market exposure of the absolute return allocation was \$1.75 billion, representing 20.1% of total market value of the portfolio. The bar chart below (left) illustrates the actual exposure compared to policy. The absolute return allocation returned 6.8% for the fiscal year versus 4.6% for the policy benchmark. The outperformance was mainly driven by hedge funds and alternative betas that outperformed the policy benchmarks by 2.6% and 3.1%, respectively. The bar chart below (right) illustrates actual performance as compared to the policy benchmark.

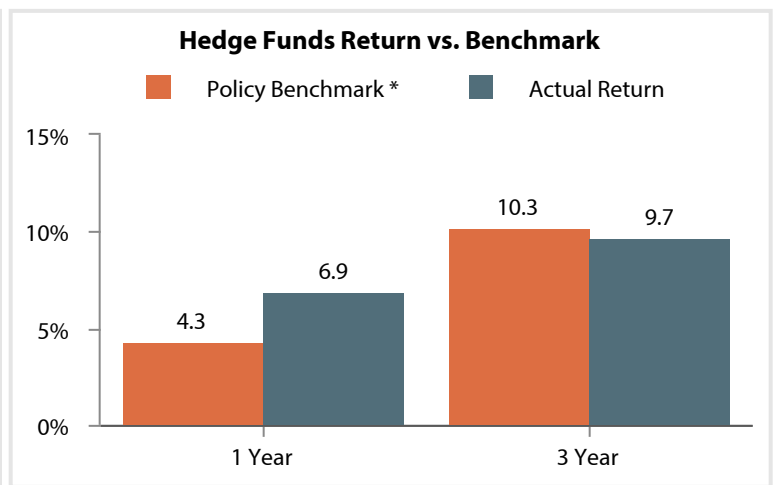
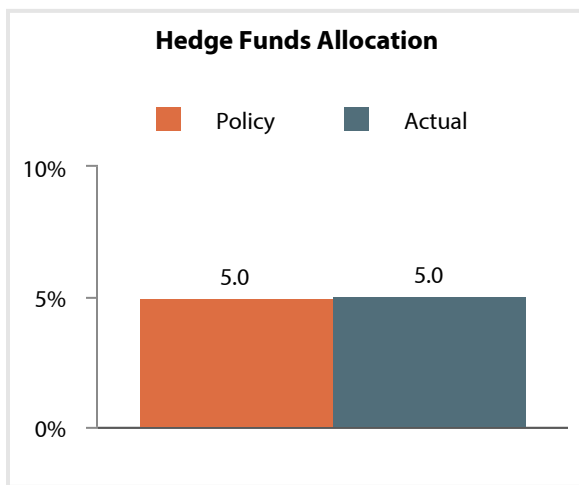


* As of June 30, 2023, the absolute return policy benchmark was comprised of 25.0% direct hedge funds policy benchmark, 50.0% alternative beta - beta policy benchmark, and 25.0% private credit policy benchmark.

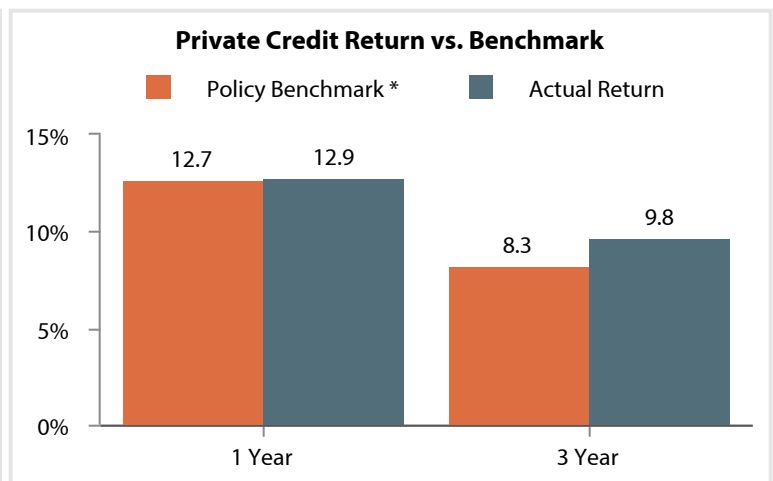
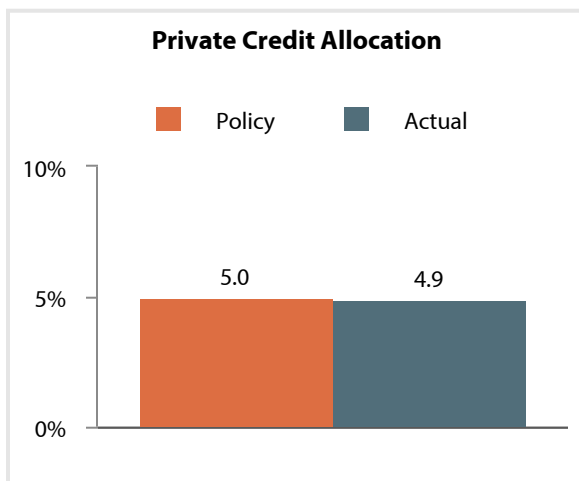
For the fiscal year, alternative betas returned 3.8% versus 0.7% for the policy benchmark. The outperformance was primarily related to a passive trend strategy implementation and manager implementation. Hedge funds, for the fiscal year, returned 6.9% compared to its policy benchmark return of 4.3%. The primary driver of the outperformance was manager implementation within the hedge fund class. For the fiscal year, private credit returned 12.9% versus 12.7% for its policy benchmark. This outperformance was due to manager implementation that outperformed the benchmark.



* As of June 30, 2023, the alternative beta - beta policy benchmark was the HFRX Macro/CTA Index.



* As of June 30, 2023, the hedge funds policy benchmark was the HFRI Fund of Funds: Conservative Index + 0.70%.



* As of June 30, 2023, the private credit policy benchmark was the Morningstar LSTA U.S. Leveraged Loan + 2%.

This page intentionally left blank.



ACTUARIAL SECTION

Guide members on the path to retirement by providing information and learning opportunities which engage and support the importance of saving for the future.

Actuary's Certification Letter



Cavanaugh Macdonald

CONSULTING, LLC

The experience and dedication you deserve

November 3, 2023

The Board of Trustees

Missouri State Employees' Retirement System

907 Wildwood Drive

Jefferson City, Missouri 65109

Dear Members of the Board:

At your request, we have performed an actuarial valuation of the Missouri State Employees' Retirement System (MOSERS) as of June 30, 2023, for the purpose of determining the employer required contribution rate for the fiscal year ending June 30, 2025. Actuarial valuations are prepared annually for the Missouri State Employees' Plan (MSEP) and the Judicial Retirement Plan. The funding policy for both plans includes the Entry Age Normal actuarial cost method, which is set statutorily, and the level percent of payroll methodology for the unfunded actuarial accrued liability (UAAL). The board of trustees is responsible for selecting the asset valuation method, amortization period, and methodology for both plans. The selection of the amortization period reflects the Board's desire to fully fund the System within a reasonable period of time that complies with actuarial standards. There have been no changes to the plan provisions or actuarial assumptions since the prior valuation, but at their September 21, 2023, meeting, the Board voted to increase the minimum contribution rate for participating MSEP employers from 16.97% of pay for all years to 28.75% of pay in fiscal year 2025, 30.25% of pay in fiscal year 2026, and 32.00% of pay in fiscal year 2027 and thereafter. The minimum contribution rate is still set to expire once the System reaches an 80% funded ratio. The major findings of the valuations are contained in this section, which reflects the plan provisions in place on June 30, 2023, including any legislation passed in the 2023 session.

During the 2022 Missouri General Assembly, legislation was passed and signed by the Governor that provided for an additional contribution of \$500 million to the Missouri State Employees' Retirement System. The funds were received by MOSERS on July 13, 2022. At the Board's direction, the accumulated balance of the additional contribution of \$500 million is excluded from the valuation assets when calculating the actuarial required contribution rate. However, the additional contribution is reflected in the funded ratio and the unfunded actuarial accrued liability.

In preparing our report, we relied, without audit, on information (some oral and some in writing) supplied by the System's staff. This information includes, but is not limited to, statutory provisions, member data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete, our results may be different, and our calculations may need to be revised.

3802 Raynor Parkway, Suite 202, Bellevue, NE 68123

www.CavMacConsulting.com

Offices in Kennesaw, GA • Bellevue, NE



We further certify that all costs, liabilities, and other factors for the plans have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the plans and reasonable expectations); meet applicable Actuarial Standards of Practice (ASOPs); and which, in combination, offer our best estimate of anticipated experience affecting the plans. Nevertheless, the emerging costs of the plans will vary from those presented herein to the extent actual experience differs from that projected by the actuarial assumptions. The board of trustees has the final decision regarding the appropriateness of the assumptions and adopted the assumptions, as indicated in Appendix D of our *MSEP Actuarial Valuation Report* and Appendix C of our *Judges Actuarial Valuation Report*.

In order to prepare the results in the actuarial valuation report, we have utilized actuarial models that were developed to measure liabilities and develop actuarial costs. These models include tools that we have produced and tested, along with commercially available valuation software that we have reviewed to confirm the appropriateness and accuracy of the output. In utilizing these models, we develop and use input parameters and assumptions about future contingent events along with recognized actuarial approaches to develop the needed results. Future actuarial measurements may differ significantly from the current measurements presented in the June 30, 2023, valuation reports due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements.

Actuarial computations presented in this section are for purposes of determining the funding amounts for MSEP and the Judicial Retirement Plan as set out in the Missouri state statutes. The calculations have been made on a basis consistent with our understanding of the plans' funding policy. Determinations for purposes other than meeting these requirements may be significantly different from the results shown in the June 30, 2023, valuation reports. Accordingly, additional determinations may be needed for other purposes.

Based upon the June 30, 2023, valuation results, annual projection forecasting and the presumption that future contributions will be made at the full actuarial contribution rate, it is our opinion that the current funding policy will systematically accumulate assets sufficient to fund all future benefits of both the Missouri State Employees' Plan and the Judicial Retirement Plan, if all actuarial assumptions are met.

We provided the information used by staff to prepare the following schedules in the *Actuarial Section: Schedules of Funding Progress, Active Members by Attained Age and Years of Service, Schedules of Active Member Valuation Data, Short-Term Solvency Test, Analysis of Financial Experience*, and the fiscal year 2023 data in the *Retirees and Beneficiaries Added and Removed*. We also provided the information used by staff to prepare the following schedules in the *Financial Section: Schedule of Employers' Net Pension Liability, Sensitivity of Net Pension Liability to Changes in the Discount Rate, Schedule of Changes in Employers' Net Pension Liability* and the *Schedule of Employer Contributions*.

Actuarial computations, based on the actuarial valuations performed as of June 30, 2023, were also prepared as of June 30, 2023, for purposes of fulfilling financial accounting requirements for the plans under Governmental Accounting Standard Number 67 (GASB 67). The Missouri State Employees' Plan is a cost-sharing multiple-employer plan, and the Judicial Retirement Plan is a single-employer plan. The assumptions used in the funding valuation were also used for GASB 67 calculations, including the 6.95% assumed rate of return used in the funding valuation. In addition, the entry age normal actuarial cost method, which is required to be used under GASB 67, is also used in the funding valuations. The actuarial assumptions and methods meet the parameters set by Actuarial Standards of Practice, as issued by the Actuarial Standards Board, and generally accepted accounting principles (GAAP) applicable in the United States of America as promulgated by the Governmental Accounting Standards Board (GASB). Additional information related to GASB 67 can be found in the *Financial Section* of this report.

Actuarial Section

The consultants who worked on this assignment are pension actuaries. Cavanaugh Macdonald Consulting, LLC's advice is not intended to be a substitute for qualified legal or accounting counsel. We certify that, to the best of our knowledge and belief, the June 30, 2023, actuarial valuation reports are complete and accurate and have been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

Sincerely,



Patrice A. Beckham, FSA, EA, FCA, MAAA
Principal and Consulting Actuary



Bryan K. Hoge, FSA, EA, FCA, MAAA
Consulting Actuary

Summary of Actuarial Assumptions

Actuarial Methods

Calculation of Normal Cost and Actuarial Accrued Liability

The funding method used to determine the normal cost and actuarial accrued liability was the entry age actuarial cost method described below.

- **Entry age actuarial cost method** – Under the entry age normal cost method, the actuarial present value of each member's projected benefit is allocated on a level basis over the member's compensation between the entry age of the member and their assumed exit age. The portion of the actuarial present value allocated to the valuation year is called the normal cost. The actuarial present value of benefits allocated to prior years of service is called the actuarial accrued liability. The unfunded actuarial accrued liability represents the difference between the actuarial accrued liability and the actuarial value of assets as of the valuation date. The unfunded actuarial accrued liability is calculated each year and reflects experience gains/losses.
- **Calculation of the actuarial value of assets (AVA)** – The Board adopted the current asset smoothing method effective with the June 30, 2018 valuation. Under the current method, the difference between the actual and assumed investment return on the fair value of assets is recognized evenly over a five-year period. No corridor is used with this method. In addition, the total unrecognized investment experience as of June 30, 2017, will be recognized evenly over a seven-year period beginning June 30, 2018.
- **Amortization of the unfunded actuarial accrued liability (UAAL)** – Beginning with the June 30, 2018, valuation, the UAAL is amortized using a "layered" approach. Under this method, the "Legacy UAAL," as determined in the June 30, 2018, valuation, is amortized over a closed 30-year period. Subsequent changes in the UAAL due to actuarial gains/losses or assumption changes are separately financed by establishing amortization bases and payments, as a level percentage of payroll, over closed 25-year periods. The bases established prior to June 30, 2021, continue to be amortized on their original schedule. Any change in the System's benefit structure shall be amortized over a closed period of 20 years, as set out in state statutes. The total UAAL amortization payment is the sum of the payments for each of the amortization bases.

Changes in Methods and Assumptions Since the Prior Year

An experience study which analyzed the System's economic and demographic assumptions was performed in 2021 and the results were presented to the Board. There have been no changes to the benefit provisions or actuarial assumptions since the prior valuation. However, in September 2023, the Board voted to increase the minimum employer contribution rate from 16.97% of pay for all years to 28.75% of pay in fiscal year 2025, 30.25% of pay in fiscal year 2026, and 32% of pay thereafter. The minimum contribution rate still expires once the System reaches a funded ratio of 80%. Also, during the 2022 Missouri General Assembly, legislation was passed and signed by the Governor that provided for an additional contribution to the System of \$500 million. The funds were received by MOSERS on July 13, 2022. At the Board's direction, the accumulated balance of the additional contribution of \$500 million will not be reflected in the valuation assets when calculating the unfunded actuarial accrued liability contribution rate, which then impacts the actuarial required contribution rate. The determination of the actuarial contribution rate in future years will not reflect the impact of the additional contribution until so directed by the MOSERS Board.

Actuarial Assumptions

Economic Assumptions

- **Investment return** – 6.95%, compounded annually, net of investment expenses
- **Inflation** – 2.25% per year
- **Payroll growth** – 2.25% per year
- **Cost-of-living adjustment (COLA)** – 4.00% on a compounded basis when a minimum COLA of 4.00% is in effect; 1.80% on a compounded basis when no minimum COLA is in effect
- **Interest on member contributions** – 1.50% per year
- **Administrative expenses** – actual prior year expenses are assumed for current year
- **Pay Increases** –
 - **MSEP** – 2.75% - 10.00% based on years of service; General Assembly members have a flat 2.50% assumption; See table on page 96 for pay increase assumptions by years of service.
 - **Judicial Plan** – 3.00% per year

Demographic Assumptions

- **Mortality** – The mortality assumption includes an appropriate level of conservatism that reflects expected future mortality improvement

MSEP/MSEP 2000/MSEP 2011

- **Post-retirement (Retirees)** – Pub-2010 General Members Below Median Healthy Retiree mortality table, scaled by 104%, set back two years for males and set forward one year for females and projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Post-retirement (Beneficiaries)** – Pub-2010 General Members Below Median Contingent Survivor mortality table, set back two years for males and set forward one year for females and projected generationally from 2010 to 2020 using Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Pre-retirement** – Pub-2010 General Members Below Median Employee mortality table, set back two years for males and set forward one year for females, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Long-term disability** – Pub-2010 Non-Safety Disabled Retiree mortality table, without mortality projection

Judicial Plan

- **Post-retirement (Retirees)** – Pub-2010 General Members Median Healthy Retiree mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Post-retirement (Beneficiaries)** – Pub-2010 General Members Median Contingent Survivor mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Pre-retirement** – Pub-2010 General Members Median Employee mortality table, projected generationally from 2010 to 2020 with Scale MP-2020 and 75% of Scale MP-2020 for years after 2020
- **Long-term disability** – None

- **Termination** –

- **MSEP** – 1.25% - 27.00% based on years of service; Elected Officials and Legislators 5.00% - 35.00% based on years of service; See tables on pages 95-96 for termination assumptions by years of service.
- **Judicial Plan** – 2.00% per year

The actuarial valuation computations were made by or under the supervision of a Member of the American Academy of Actuaries (MAAA). Assumptions were adopted based on the findings of the experience study covering the five-year period ending June 30, 2020, and presented to the Board in 2021.

MSEP**Percent of Eligible Active Members Retiring Within the Next Year**

MSEP	
Early Retirement	
Retirement Age	Percent Retiring
55-56	1%
57-59	2
60-61	8
62	25
63-64	5

MSEP 2000	
Early Retirement	
Retirement Age	Percent Retiring
57-59	3%
60-61	5

MSEP 2011	
Early Retirement	
Retirement Age	Percent Retiring
62-64	10%
65	15
66	20

MSEP	
Normal Retirement	
Retirement Age	Percent Retiring
48-61	17%
62	21
63-64	17
65-66	30
67-69	25
70	40
71-77	25
78	100

MSEP 2000	
Normal Retirement	
Retirement Age	Percent Retiring
48-57	35%
58-60	20
61	12
62	16
63	12
64	20
65	27
66	30
67-69	25
70	30
71-77	25
78	100

MSEP 2011	
Normal Retirement	
Retirement Age	Percent Retiring
55-57	40%
58-66	15
67-77	20
78	100

Judicial Plan**Percent of Eligible Active Members Retiring Within the Next Year****Judicial Plan**

Early Retirement		Normal Retirement	
Retirement Age	Percent Retiring	Retirement Age	Percent Retiring
62-69	5%	55	10%
70	100	56-63	3
		64-66	10
		67	17.5
		68	25
		69	35
		70	100

Judicial Plan 2011

Normal Retirement	
Retirement Age	Percent Retiring
62	10%
63-66	3
67	25
68-69	20
70	100

Elected Officials and Legislators**Percent of Active Members Terminating Within the Next Year**

Years of Service	Percent Terminating
0-3	5%
4-7	12
8+	35

MSEP

Separations From Active Employment Before Service Retirement Assumptions

Termination*		Disability	
Years of Service	Rate	Age	Rate
1	27.00%	25	0.03%
5	12.75	30	0.07
10	7.00	35	0.11
15	4.30	40	0.22
20	2.25	45	0.32
25+	1.25	50	0.43
		55	0.54
		60	0.59
		65	0.64

*Does not apply to elected officials and legislators.

MSEP

Pay Increase Assumptions

Years of Service	Rates by Service*			Total
	Inflation	Productivity	Merit	
0	2.25%	0.25%	7.50%	10.00%
1	2.25	0.25	2.50	5.00
2	2.25	0.25	2.25	4.75
3	2.25	0.25	2.00	4.50
4	2.25	0.25	1.85	4.35
5	2.25	0.25	1.70	4.20
10	2.25	0.25	1.00	3.50
15	2.25	0.25	0.75	3.25
20	2.25	0.25	0.50	3.00
25+	2.25	0.25	0.25	2.75

*General assembly members have a flat 2.5% assumption.

Other Assumptions June 30, 2023

- **Form of payment**

MSEP

- 50% Joint & survivor

MSEP 2000/MSEP 2011

- Straight life annuity

Judicial Plan

- **First employed before January 1, 2011** – 50% Joint & survivor
- **First employed on or after January 1, 2011** – Straight life annuity

- **Marital status**

MSEP/MSEP 2000/MSEP 2011

- **Percent married** – 65% married at retirement, 50% of those dying in active service are married
- **Spouse's age** – Females assumed to be three years younger than males

Judicial Plan

- **Percent married** – 90% married
- **Spouse's age** – Females assumed to be four years younger than males

- **Pay increase timing** – Pay increases are assumed to occur at the beginning of the fiscal year.

- **Decrement timing** – Decrements of all types are assumed to occur mid-year.

- **Eligibility testing** – Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

- **Benefit service** – Exact fractional service is used to determine the amount of the benefit payable.

- **Decrement relativity** – Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

- **Decrement operation** – Disability and withdrawal do not operate during normal retirement eligibility.

- **Other liability adjustments**

MSEP/MSEP 2000

- Pre-retirement survivor benefits for spouse of an inactive-vested member. These factors are used to estimate the cost of immediate unreduced survivor annuities upon the death of a vested member.

Age	Male	Female
<30	1.56	1.42
30-39	1.26	1.20
40-49	1.11	1.08
>49	1.02	1.02

- **Incidence of contributions** – Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report and the actual payroll payable at the time contributions are made. New entrant normal cost contributions are applied to the funding of new entrant benefits.

- **Retirement election**

MSEP 2000

- All regular state employees first employed on or before June 30, 2000, are assumed to elect MSEP 2000 prior to age 62 and MSEP on or after age 62.
- Elected officials, general assembly members, and uniformed water patrol members first employed before July 1, 2000, are assumed to elect MSEP at retirement.

- **Service adjustment**

MSEP/MSEP 2000

- It is assumed that each member will be granted seven months of service credit; four months for unused leave upon retirement and three months for military service purchases.

MSEP 2011

- It is assumed that each member will be granted five months of service credit for unused leave upon retirement. These member are not eligible for military service purchases.

- **Forfeitures**

MSEP 2011/Judicial Plan

- For those first employed on or after January 1, 2011, employees are assumed to take a refund and forfeit their deferred pension if the refund amount is greater than the present value of their deferred benefit.

- **Salary and benefit limits** – For purposes of the valuation, no limits were applied to member compensation or benefits.

- **Commencement age for deferred vested benefit** – normal retirement date.

- **Data Adjustments**

MSEP/MSEP 2000/MSEP 2011

Active and retired member data was reported as of May 31, 2023. It was brought forward to June 30, 2023, by adding one month of service for all active members, one month of contributions and interest for MSEP 2011 members, and the June COLA for certain retired members. Financial information continues to be reported annually as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the October 1 statutory deadline.

Active members reported with less than a \$100 annualized salary were assumed to received the average active member pay. As a result, there are 52 active members in the June 30, 2023, data whose salary is assumed to be \$51,750.

When the option of choosing plans is available, inactive-vested members are reported with two records, one with benefits under the MSEP and one with benefits under the MSEP 2000. Because it is unknown what the member will elect at retirement, both records are valued and the plan that produces the higher present value of future benefits is used for valuation purposes.

For any retired member who has elected a joint and survivor benefit, yet has no beneficiary date of birth provided, it was assumed that the beneficiary is three years younger for male retirees and three years older for female retirees.

Judicial Plan

Active and retired member data was reported as of May 31, 2023. It was brought forward to June 30, 2023, by adding one month of service for all active members, one month of contributions and interest for Judicial Plan 2011 members, and the June COLA for certain retired members. Financial information continues to be reported annually as of June 30. This procedure was instituted to provide sufficient time for the Board of Trustees to certify the appropriate contribution rate prior to the October 1 statutory deadline.

Active members reported with no annualized salary were assumed to receive the average active member pay.

Other Technical Valuation Procedures

Salary increases are assumed to apply to annual amounts.

Decrement are assumed to occur mid-year, except that immediate retirement is assumed for those who are at or older than the age at which retirement rates are 100%.

No actuarial liability is included for participants who terminated without being vested prior to the valuation date, except those due a refund of contributions.

Pension Trust Funds

Employer Schedules of Funding Progress

Last Ten Fiscal Years

MOSERS uses the entry age normal actuarial cost method which allocates the actuarial present value of each member's projected benefits on a level basis over the member's pensionable compensation between the entry age of the member and assumed exit ages.

MSEP

Actuarial Valuation Date as of June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Percent Funded (a/b)	Annual Covered Payroll (c)	UAAL Percentage of Covered Payroll [(b-a)/c]
2023	\$ 9,331,207,050	\$ 16,190,813,686	\$ 6,859,606,636	57.6%	\$ 2,225,164,914	308.3%
2022	8,894,328,756	15,408,995,032	6,514,666,276	57.7	1,972,872,754	330.2
2021	8,909,251,051	15,110,646,537	6,201,395,486	59.0	1,961,975,052	316.1
2020	8,711,224,151	14,258,408,888	5,547,184,737	61.1	1,980,910,473	280.0
2019	8,782,383,977	13,957,626,309	5,175,242,332	62.9	1,930,764,635	268.0
2018	8,830,410,210	13,612,763,961	4,782,353,751	64.9	1,915,143,002	249.7
2017	8,872,381,848	13,152,273,895	4,279,892,047	67.5	1,941,969,786	220.4
2016	8,878,057,191	12,751,162,753	3,873,105,562	69.6	1,921,528,936	201.6
2015	8,792,485,658	11,727,618,410	2,935,132,752	75.0	1,918,527,768	153.0
2014	8,637,758,955	11,494,571,835	2,856,812,880	75.1	1,902,719,928	150.1

Judicial Plan

Actuarial Valuation Date as of June 30	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Percent Funded (a/b)	Annual Covered Payroll (c)	UAAL Percentage of Covered Payroll [(b-a)/c]
2023	\$ 207,085,203	\$ 654,242,323	\$ 447,157,120	31.7%	\$ 64,660,037	691.6%
2022	203,997,065	630,043,013	426,045,948	32.4	63,317,888	672.9
2021	194,988,153	626,284,219	431,296,066	31.1	63,031,506	684.3
2020	180,713,310	624,847,011	444,133,701	28.9	61,450,808	722.7
2019	172,224,529	617,482,705	445,258,176	27.9	60,380,734	737.4
2018	162,135,045	593,788,592	431,653,547	27.3	59,551,874	724.8
2017	151,828,631	564,417,925	412,589,294	26.9	58,150,935	709.5
2016	143,468,860	547,621,617	404,152,757	26.2	57,421,016	703.8
2015	134,349,908	482,969,311	348,619,403	27.8	55,656,457	626.4
2014	124,269,105	462,336,255	338,067,150	26.9	49,587,936	681.8

See *Schedules of Employer Contributions* on page 56.

Pension Trust Funds

Summary of Member Data Included in Valuations

June 30, 2023

Active Members

Valuation Group	Number	Annual Covered Payroll	Group Averages		
			Annual Salary	Age (Yrs)	Service (Yrs)
MSEP					
Regular state employees	42,299	\$ 2,166,866,321	\$ 51,227	45.0	10.0
Elected officials	5	579,440	115,888	51.4	5.3
Legislative clerks	3	139,095	46,365	68.3	29.7
Legislators	196	7,335,785	37,427	52.0	3.9
Uniformed water patrol	8	717,807	89,726	46.3	20.3
School-term salaried employees	563	47,752,326	84,818	57.0	21.6
Administrative law judges	14	1,774,140	126,724	64.2	27.2
Total MSEP group	43,088	\$ 2,225,164,914	51,642	45.2	10.1
Judicial Plan	415	\$ 64,660,037	\$ 155,807	54.8	9.8

Retired Members and Beneficiaries

Type of Benefit Payment	Number	Annual Benefits	Group Averages	
			Benefit	Age (Yrs)
MSEP				
Retirement	48,472	\$ 850,037,772	\$ 17,537	71.4
Survivor of active member	1,762	21,764,556	12,352	64.4
Survivor of retired member	4,475	66,047,028	14,759	76.4
Total MSEP group	54,709	\$ 937,849,356	17,143	71.6
Judicial Plan	619	\$ 47,016,936	\$ 75,956	76.8

Other Members

Plans	Number Inactive-Vested	Number Inactive-Nonvested	Number Leave of Absence	Number Long-Term Disability
MSEP	17,651	31,575	106	548
Judicial Plan	32	0	0	0

Active Members by Attained Age and Years of Service

June 30, 2023

MSEP

Attained Age	Years of Service to Valuation Date								Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35+	No.	Valuation Payroll
< 25	2,596	17							2,613	\$ 108,957,395
25-29	3,345	530	5						3,880	173,740,415
30-34	2,623	1,402	299	18					4,342	208,308,167
35-39	2,017	1,274	827	400	15				4,533	233,947,167
40-44	1,807	1,031	772	1,064	460	30			5,164	274,081,789
45-49	1,503	885	681	811	1,036	478	12		5,406	296,877,571
50-54	1,499	881	672	764	1,019	1089	244	13	6,181	337,510,080
55-59	1,263	801	652	713	783	597	356	113	5,278	285,760,856
60-64	855	719	525	585	522	394	199	171	3,970	211,163,320
65+	357	323	241	241	186	134	103	136	1,721	94,818,154
Totals	17,865	7,863	4,674	4,596	4,021	2,722	914	433	43,088	\$ 2,225,164,914

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages: Age – 45.2 years • Service – 10.1 years • Annual pay – \$51,642

Judicial Plan

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30+	No.	Valuation Payroll
< 40	21	4	1					26	\$ 4,004,194
40-44	39	12	2					53	8,089,023
45-49	24	16	10	2				52	7,898,714
50-54	23	23	11	8				65	10,047,211
55-59	18	23	16	12	13			82	12,880,336
60-64	12	23	18	11	8	8	2	82	12,923,171
65+	4	9	10	5	8	11	8	55	8,817,388
Totals	141	110	68	38	29	19	10	415	\$ 64,660,037

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Group Averages: Age – 54.8 years • Service – 9.8 years • Annual pay – \$155,807

Schedules of Active Member Valuation Data

Last Ten Fiscal Years

MSEP

Schedule of Active Member Valuation Data

Valuation Date as of June 30	Participating Employers	Number	Annual Payroll	Average Annual Pay	% Increase in Average Pay
2023	17	43,088	\$ 2,225,164,914	\$ 51,642	8.88%
2022	17	41,595	1,972,872,754	47,431	3.54
2021	17	42,829	1,961,975,052	45,809	6.37
2020	17	45,999	1,980,910,473	43,064	4.53
2019	17	46,864	1,930,764,635	41,199	2.84
2018	18	47,806	1,915,143,002	40,061	0.90
2017	18	48,910	1,941,969,786	39,705	2.21
2016	18	49,464	1,921,528,936	38,847	1.20
2015	18	49,980	1,918,527,768	38,386	2.12
2014	18	50,621	1,902,719,928	37,588	1.62

Judicial Plan

Schedule of Active Member Valuation Data

Valuation Date as of June 30	Participating Employers	Number	Annual Payroll	Average Annual Pay	% Increase in Average Pay
2023	1	415	\$ 64,660,037	\$ 155,807	2.12%
2022	1	415	63,317,888	152,573	1.18
2021	1	418	63,031,506	150,793	2.57
2020	1	418	61,450,808	147,012	0.80
2019	1	414	60,380,734	145,847	1.64
2018	1	415	59,551,874	143,498	1.17
2017	1	410	58,150,935	141,832	0.78
2016	1	408	57,421,016	140,738	2.41
2015	1	405	55,656,457	137,423	12.24
2014	1	405	49,587,936	122,439	0.57

Retirees and Beneficiaries Added and Removed - MSEP

Last Ten Fiscal Years

Fiscal Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year		Percentage Increase/(Decrease)		
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowances	Average Annual Allowances
Benefit Type	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowances	Average Annual Allowances
2023									
Retirees	2,077	\$ 68,905,883	1,673	\$ 25,437,207	48,472	\$ 850,037,772	\$ 17,537	5.39%	4.51%
Beneficiaries	436	10,087,007	369	4,521,922	6,237	87,811,584	14,079	6.77	5.62
2022									
Retirees	2,852	63,494,964	1,628	26,000,820	48,068	806,569,096	16,780	4.88	2.20
Beneficiaries	633	9,697,992	409	4,179,852	6,170	82,246,499	13,330	7.19	3.30
2021									
Retirees	2,679	52,111,212	1,558	24,543,024	46,844	769,074,952	16,418	3.72	1.24
Beneficiaries	623	8,799,852	397	4,270,596	5,946	76,728,359	12,904	6.27	2.23
2020									
Retirees	2,393	47,592,468	1,347	21,088,044	45,723	741,506,764	16,217	3.71	1.33
Beneficiaries	506	7,538,112	358	3,849,576	5,720	72,199,103	12,622	5.38	2.66
2019									
Retirees	2,510	49,663,164	1,247	20,068,656	44,677	715,002,340	16,004	4.32	1.37
Beneficiaries	513	7,606,344	321	3,395,964	5,572	68,510,567	12,296	6.55	2.88
2018									
Retirees	2,875	51,096,000	1,295	17,429,136	43,414	685,407,832	15,788	5.17	1.34
Beneficiaries	480	6,373,080	334	3,124,044	5,380	64,300,187	11,952	5.32	2.46
2017									
Retirees	2,810	44,397,240	1,282	17,552,484	41,834	651,740,968	15,579	4.30	0.49
Beneficiaries	473	5,953,224	276	2,599,608	5,234	61,051,151	11,664	5.81	1.83
2016									
Retirees	2,829	41,259,384	1,165	15,963,864	40,306	624,896,212	15,504	4.22	(0.08)
Beneficiaries	475	5,779,596	283	2,563,344	5,037	57,697,535	11,455	5.90	1.87
2015									
Retirees	2,885	43,895,520	1,066	14,075,772	38,642	599,600,692	15,517	5.23	0.28
Beneficiaries	465	5,649,900	246	2,203,788	4,845	54,481,283	11,245	6.75	1.93
2014									
Retirees	2,631	37,702,375	956	12,406,774	36,823	569,780,944	15,474	4.65	(0.11)
Beneficiaries	421	5,141,385	197	1,842,199	4,626	51,035,171	11,032	6.91	1.73

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Retirees and Beneficiaries Added and Removed - Judicial Plan

Last Ten Fiscal Years

Fiscal Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls at End of Year		Average Annual Allowances	Percentage Increase/(Decrease)	
	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances		Annual Allowances	Average Annual Allowances
Benefit Type	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	Annual Allowances	Average Annual Allowances
2023									
Retirees	29	\$ 5,060,044	22	\$ 1,346,394	469	\$ 40,717,656	\$ 86,818	10.04%	8.39%
Beneficiaries	15	906,924	7	329,877	150	6,299,280	41,995	10.08	4.21
2022									
Retirees	20	2,572,248	18	1,531,644	462	37,004,006	80,095	2.89	2.45
Beneficiaries	12	594,912	20	729,228	142	5,722,233	40,297	(2.29)	3.21
2021									
Retirees	26	2,674,404	13	824,256	460	35,963,402	78,181	5.42	2.44
Beneficiaries	10	411,408	11	469,104	150	5,856,549	39,044	(0.98)	(0.32)
2020									
Retirees	21	2,245,320	9	753,144	447	34,113,254	76,316	4.57	1.77
Beneficiaries	7	397,068	11	449,532	151	5,914,245	39,167	(0.88)	1.75
2019									
Retirees	39	3,749,292	17	1,357,068	435	32,621,078	74,991	7.91	2.46
Beneficiaries	12	643,452	15	555,528	155	5,966,709	38,495	1.50	3.46
2018									
Retirees	23	2,642,868	15	1,074,540	413	30,228,854	73,193	5.47	3.43
Beneficiaries	9	470,700	8	322,200	158	5,878,785	37,208	2.59	1.94
2017									
Retirees	21	2,128,128	16	1,239,612	405	28,660,526	70,767	3.20	1.93
Beneficiaries	12	507,360	2	87,936	157	5,730,285	36,499	7.90	1.03
2016									
Retirees	16	1,671,084	14	1,078,356	400	27,772,010	69,430	2.18	1.67
Beneficiaries	8	383,940	11	397,176	147	5,310,861	36,128	(0.25)	1.79
2015									
Retirees	39	3,599,880	21	1,395,888	398	27,179,282	68,290	8.82	3.90
Beneficiaries	18	739,788	5	198,348	150	5,324,097	35,494	11.32	1.67
2014									
Retirees	18	1,671,667	8	443,807	380	24,975,290	65,724	5.17	2.40
Beneficiaries	7	320,389	7	216,813	137	4,782,657	34,910	2.21	2.21

Source: FY23 from MOSERS' Judicial Plan Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Short-Term Solvency Test

Last Ten Fiscal Years

MSEP

Actuarial Accrued Liabilities for

Fiscal Year	Member Contributions (1)	Current Retirees and Beneficiaries (2)	Active and Inactive Members, Employer Financed Portion (3)	Actuarial Value of Assets Available for Benefits	Percentage of Actuarial Liabilities Covered by Actuarial Value of Assets Available for		
					(1)	(2)	(3)
2023	\$ 255,269,694	\$ 9,939,272,500	\$ 5,996,271,492	\$ 9,331,207,050	100.0%	91.3%	0.0%
2022	217,318,884	9,463,674,203	5,728,001,945	8,894,328,756	100.0	91.7	0.0
2021	187,797,531	9,037,922,330	5,884,926,676	8,909,251,051	100.0	96.5	0.0
2020	157,133,312	8,701,290,590	5,399,984,986	8,711,224,151	100.0	98.3	0.0
2019	128,255,311	8,430,014,973	5,399,356,055	8,782,383,977	100.0	100.0	4.2
2018	103,784,514	8,073,692,664	5,435,286,783	8,830,410,210	100.0	100.0	12.0
2017	78,979,370	7,559,623,100	5,513,671,425	8,872,381,848	100.0	100.0	22.4
2016	60,618,379	7,305,895,284	5,384,649,090	8,878,057,191	100.0	100.0	28.1
2015	42,731,658	6,695,631,737	4,989,255,015	8,792,485,658	100.0	100.0	41.2
2014	27,111,467	6,347,728,717	5,119,731,651	8,637,758,955	100.0	100.0	44.2

Judicial Plan

Actuarial Accrued Liabilities for

Fiscal Year	Member Contributions (1)	Current Retirees and Beneficiaries (2)	Active and Inactive Members, Employer Financed Portion (3)	Actuarial Value of Assets Available for Benefits	Percentage of Actuarial Liabilities Covered by Actuarial Value of Assets Available for		
					(1)	(2)	(3)
2023	\$ 10,319,516	\$ 481,684,580	\$ 162,238,227	\$ 207,085,203	100.0%	40.8%	0.0%
2022	8,675,309	440,091,330	181,276,374	203,997,065	100.0	44.4	0.0
2021	7,294,197	438,537,859	180,452,163	194,988,153	100.0	42.8	0.0
2020	5,991,360	436,014,583	182,841,068	180,713,310	100.0	40.1	0.0
2019	4,421,019	434,204,353	178,857,333	172,224,529	100.0	38.6	0.0
2018	3,124,482	401,725,610	188,938,500	162,135,045	100.0	39.6	0.0
2017	2,232,405	377,099,534	185,085,986	151,828,631	100.0	39.7	0.0
2016	1,855,955	354,715,048	191,050,614	143,468,860	100.0	39.9	0.0
2015	1,204,757	316,042,514	165,722,040	134,349,908	100.0	42.1	0.0
2014	716,564	285,124,436	176,469,255	124,269,105	100.0	43.3	0.0

Analysis of Financial Experience

Year Ended June 30, 2023

Actual experience will never coincide exactly with assumed experience (except by coincidence). Gains and losses may offset each other over a period of years, but sizable year-to-year variations from assumed experience are common. Detail on the analysis of the financial experience is shown below. A more detailed discussion of the components of our actuarial experience can be found in our June 30, 2023 actuarial valuation report, which is available at our website, www.mosers.org.

MSEP		Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
Unfunded actuarial accrued liability (UAAL) at beginning of year	\$ 6,514,666,276	2023	(5.8)%
Normal cost from last valuation	155,261,603	2022	(1.3)
Actual employer and member contributions	(1,129,149,110)	2021	(0.7)
Miscellaneous income	(646)	2020	(2.3)
Administrative expenses	10,984,550	2019	(1.8)
Interest accrual	409,184,562	2018	(0.9)
Expected UAAL	5,960,947,235	2017	(1.6)
Less: Actual UAAL at end of year	(6,859,606,636)	2016	(3.2)
Gain (loss) during year from experience	\$ (898,659,401)	2015	(0.9)
Gain (loss) as a percent of expected actuarial accrued liabilities at start of year (\$15,625,885,958)	(5.8)%	2014	2.1

Judicial		Valuation Date June 30	Actuarial Gain (Loss) as a % of Beginning Accrued Liabilities
Unfunded actuarial accrued liability (UAAL) at beginning of year	\$ 426,045,948	2023	(3.2)%
Normal cost from last valuation	12,190,544	2022	0.5
Actual employer and member contributions	(40,811,671)	2021	1.4
Administrative expenses	91,076	2020	(0.2)
Interest accrual	29,066,163	2019	(0.8)
Expected UAAL	426,582,060	2018	(0.3)
Less: Actual UAAL at end of year	(447,157,120)	2017	(0.3)
Gain (loss) during year from experience	\$ (20,575,060)	2016	0.1
Gain (loss) as a percent of expected actuarial accrued liabilities at start of year (\$640,219,005)	(3.2)%	2015	(1.5)
		2014	1.5

Comparison of Plans for General State Employees

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Eligible members employed in positions which normally require at least 1,040 hours of work per year</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000, and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011, or Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. <i>Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility</i> Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 10 years of service <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Age 57 + 5 years of service <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service at time of termination <i>Base benefit reduced 1/2 of 1% (.005) for each month age is younger than normal retirement</i>

Comparison of Plans for General State Employees (continued)

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 65 + 5 years of service, or Age 60 + 15 years of service, or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service, or Rule of 80 – (at least age 48) Age + years of service = 80 or more at time of termination <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> 	<ul style="list-style-type: none"> Age 67 + 5 years of service, or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> .016 x FAP x Service <i>Future formula increases, if any, may be passed along to retirees.</i> 	<ul style="list-style-type: none"> .017 x FAP x Service <i>Future formula increases, if any, will not be passed along to retirees.</i> 	<ul style="list-style-type: none"> .017 x FAP x Service <i>Future formula increases, if any, will not be passed along to retirees.</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> .008 x FAP x Service <i>Available to members retiring under Rule of 80</i> 	<ul style="list-style-type: none"> .008 x FAP x Service <i>Available to members retiring under Rule of 90</i>
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Employed before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Employed on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Effective August 28, 2023, an active previously retired member may return to state employment as a Missouri state legislator or statewide elected official and continue receiving their pension benefit based on their prior MOSERS service.

Comparison of Plans for Legislators

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Elected Members of the General Assembly</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000, and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011, or Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 3 biennial assemblies (6 years) 	<ul style="list-style-type: none"> 3 biennial assemblies (6 years) 	<ul style="list-style-type: none"> 3 biennial assemblies (6 years)
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. <i>Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility</i> Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Legislators (continued)

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 3 biennial assemblies, or Rule of 80 – (at least age 48) Age + years of service = 80 or more 	<ul style="list-style-type: none"> Age 55 + 3 biennial assemblies, or Rule of 80 – (at least age 50) Age + years of service = 80 or more at time of termination 	<ul style="list-style-type: none"> Age 62 + 3 biennial assemblies, or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> Biennial Assemblies x \$150 <i>Future formula increases, if any, may be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 100% of pay; future formula increases, if any, will not be passed along to retirees.</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Effective August 28, 2023, an active previously retired member may return to state employment as a Missouri state legislator or statewide elected official and continue receiving their pension benefit based on their prior MOSERS service.

Comparison of Plans for Statewide Elected Officials

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Membership <i>Members elected to state office</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000, and vested in MSEP 	<ul style="list-style-type: none"> First employed on or after July 1, 2000, but prior to January 1, 2011, or Left state employment prior to becoming vested and returned to employment on or after July 1, 2000 	<ul style="list-style-type: none"> First employed on or after January 1, 2011, or Returned to employment after electing the buyout option
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 4 years (1 term) 	<ul style="list-style-type: none"> 4 years (1 term) 	<ul style="list-style-type: none"> 4 years (1 term)
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800; under 105.691 with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 104.1090 or 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS, Lincoln Univ.; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service. 	<ul style="list-style-type: none"> May transfer service under 105.691 from other systems with written agreements to transfer required funds; from MPERS, PSRS/PEERS; service as circuit clerk, deputy circuit clerk, division clerk, or juvenile court employee; or qualifying state board service.
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of rate of compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. <i>Payable the month following the member's death; for inactive-vested, payable when member would have reached normal retirement eligibility</i> Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of current pay. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 10 years of service <i>Base benefit reduced ½ of 1% (.005) for each month age is younger than normal retirement</i> 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Comparison of Plans for Statewide Elected Officials (continued)

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000	MSEP 2011
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 65 + 4 years of service, or Age 60 + 15 years of service, or Rule of 80 – (at least age 50) Age + years of service = 80 or more 	<ul style="list-style-type: none"> Age 55 + 4 years of service, or Rule of 80 – (at least age 50) Age + years of service = 80 or more at time of termination 	<ul style="list-style-type: none"> Age 62 + 4 years of service, or Rule of 90 – (at least age 55) Age + years of service = 90 or more at time of termination
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> Less than 12 years of service .016 x FAP x Service 12+ years of service Monthly Statutory Comp. x .50 <i>Future formula increases, if any, may be passed along to retirees</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees.</i> 	<ul style="list-style-type: none"> (Active Pay ÷ 24) x Service <i>Capped at 12 years of service or 50% of pay; future formula increases, if any, will not be passed along to retirees.</i>
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 12+ years of service In addition to applicable COLA above, benefit will be recalculated for increases in statutory compensation for highest position held. 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member 	<ul style="list-style-type: none"> Benefit adjustment based on increase in pay for an active member
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> Applicable COLA rate (if eligible) 	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Not available

Effective August 28, 2023, an active previously retired member may return to state employment as a Missouri state legislator or statewide elected official and continue receiving their pension benefit based on their prior MOSERS service.

Comparison of Plans for Judges

June 30, 2023

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Membership	<ul style="list-style-type: none"> Must be employed prior to January 1, 2011, in a MOSERS benefit-eligible position as a judge or commissioner of the supreme court, court of appeals, any circuit court (does not include municipal judge), probate court, magistrate court, court of common pleas, criminal corrections, justice of the peace; commissioner or deputy commissioner of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government or in a city not within a county; commissioner of the juvenile division of the circuit court appointed pursuant to RSMo 211.023 or drug treatment court pursuant to RSMo 478.466, or any family court. 	<ul style="list-style-type: none"> Employed for the first time on or after January 1, 2011, as a judge or commissioner of the supreme court, court of appeals, any circuit court (does not include municipal judge), probate court, magistrate court, court of common pleas, criminal corrections, justice of the peace; commissioner or deputy commissioner of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government or in a city not within a county; commissioner of the juvenile division of the circuit court appointed pursuant to RSMo 211.023 or drug treatment court pursuant to RSMo 478.466, or any family court.
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> 4% of pay
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> Automatic the day you become a member 	<ul style="list-style-type: none"> Automatic the day you become a member
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase qualifying public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 or under 105.691 with written agreements to transfer required funds 	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 or under 105.691 with written agreements to transfer required funds
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death Survivor benefit paid to eligible spouse equal to 50% of benefit the member would have received based on service to age 70. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death Survivor benefit paid to eligible spouse equal to 50% of benefit the member would have received based on service to age 70. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Less than 12 years of service <i>Age 62 or</i> Less than 15 years of service <i>Age 60</i> 	<ul style="list-style-type: none"> Less than 12 years of service <i>Age 67 or</i> Less than 20 years of service <i>Age 62</i>
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 62 + 12 years of service, or Age 60 + 15 years of service, or Age 55 + 20 years of service 	<ul style="list-style-type: none"> Age 67 + 12 years of service, or Age 62 + 20 years of service

Comparison of Plans for Judges (continued)

June 30, 2023

Benefit Provisions	Judicial Plan (Closed Plan)	Judicial Plan 2011
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> • $\text{Monthly pay} \times .50 = \text{Monthly Base Benefit}$ 	<ul style="list-style-type: none"> • $\text{Monthly pay} \times .50 = \text{Monthly Base Benefit}$
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> • Not available 	<ul style="list-style-type: none"> • Not available
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> • Not available 	<ul style="list-style-type: none"> • Not available
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> • Life Income Annuity (if unmarried) • Automatic Unreduced Joint & 50% Survivor (if married) 	<ul style="list-style-type: none"> • Life Income Annuity • Joint & 50% Survivor • Joint & 100% Survivor • Life Income with 120 Guaranteed Payments • Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> • Sworn in before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) • Sworn in on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> • Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 60</i>	<ul style="list-style-type: none"> • Judges who work beyond normal retirement have increased benefits upon retirement. 	<ul style="list-style-type: none"> • Not available

Comparison of Plans for Uniformed Members of the Water Patrol

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Membership <i>Eligible members employed in positions which normally require at least 1,040 hours of work per year</i>	<ul style="list-style-type: none"> Employed prior to July 1, 2000, and vested in MSEP 	<ul style="list-style-type: none"> Employed for the first time on or after July 1, 2000, but prior to January 1, 2011, or Left state employment prior to becoming vested and returned to employment on or after July 1, 2000
Employee Contributions	<ul style="list-style-type: none"> None 	<ul style="list-style-type: none"> None
Vesting <i>Eligible for future pension</i>	<ul style="list-style-type: none"> 5 years 	<ul style="list-style-type: none"> 5 years
Service Purchases	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost 	<ul style="list-style-type: none"> May purchase up to 4 years of active-duty military service or qualifying public sector service at subsidized rate; may also purchase public sector service at full actuarial cost
Service Transfers	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.800 	<ul style="list-style-type: none"> May transfer state service to other positions covered by MOSERS under 104.1090
Death Prior to Retirement	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i> 	<ul style="list-style-type: none"> Nonduty-related death (<i>vested members</i>) Survivor benefit paid using Joint & 100% survivor option to eligible spouse or 80% of life income annuity paid to eligible children. Duty-related death (<i>no min. service requirement</i>) Survivor benefit to eligible spouse or children no less than 50% of average compensation. <i>Payable the month following the member's death</i>
Early Retirement <i>Eligible for reduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> Age 57 + 10 years of service
Normal Retirement <i>Eligible for unreduced pension benefit once age and service requirements are met</i>	<ul style="list-style-type: none"> Age 55 + 5 years of service, or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> 	<ul style="list-style-type: none"> Age 62 + 5 years of service, or Rule of 80 – (at least age 48) Age + years of service = 80 or more <i>Age 50 if first became eligible prior to Aug. 28, 2003</i> <i>Inactive-vested members ineligible for Rule of 80</i>
Base Benefit <i>Payable for life</i>	<ul style="list-style-type: none"> .016 x FAP x Service increased by 33% <i>Future formula increases, if any, may be passed along to retirees</i> 	<ul style="list-style-type: none"> .017 x FAP x Service <i>Future formula increases, if any, will not be passed along to retirees</i>

Eligibility for membership in the MSEP and MSEP 2000 is closed for uniformed members of the water patrol. Employees hired on or after January 1, 2011, are members of the Missouri Department of Transportation and Patrol Employees' Retirement System (MPERS).

Comparison of Plans for Uniformed Members of the Water Patrol (continued)

June 30, 2023

Benefit Provisions	MSEP (Closed Plan)	MSEP 2000
Temporary Benefit <i>Stops at age 62</i>	<ul style="list-style-type: none"> Not available 	<ul style="list-style-type: none"> $.008 \times \text{FAP} \times \text{Service}$ <i>Available to members retiring under Rule of 80</i>
BackDROP <i>Lump-sum payment at retirement in addition to reduced monthly pension</i>	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable) 	<ul style="list-style-type: none"> Must work at least 2 years beyond normal retirement eligibility to be eligible; elect BackDROP at retirement (if applicable)
Benefit Payment Options <i>Determines whether or not a benefit will be paid to anyone after member's death</i>	<ul style="list-style-type: none"> Life Income Annuity Unreduced Joint & 50% Survivor Joint & 100% Survivor Life Income with 60 Guaranteed Payments Life Income with 120 Guaranteed Payments 	<ul style="list-style-type: none"> Life Income Annuity Joint & 50% Survivor Joint & 100% Survivor Life Income with 120 Guaranteed Payments Life Income with 180 Guaranteed Payments
Cost-of-Living Adjustment (COLA) <i>Helps offset effects of inflation increasing the cost of goods and services</i>	<ul style="list-style-type: none"> Employed before Aug. 28, 1997 Receive 4-5% each year until reaching 65% COLA cap. After reaching cap, rate is based on 80% of the percentage increase in the average CPI (0-5%) Employed on/after Aug. 28, 1997 Based on 80% of the percentage increase in the average CPI (0-5%) 	<ul style="list-style-type: none"> Based on 80% of the percentage increase in the average CPI (0-5%)
In-Service COLA <i>Service beyond age 65</i>	<ul style="list-style-type: none"> COLA given for service beyond age 65 <i>COLA provisions determined by employment date</i> 	<ul style="list-style-type: none"> Not available

Eligibility for membership in the MSEP and MSEP 2000 is closed for uniformed members of the water patrol. Employees hired on or after January 1, 2011, are members of the Missouri Department of Transportation and Patrol Employees' Retirement System (MPERS).

Life Insurance Plans

June 30, 2023

MOSERS administers basic and optional term life insurance plans for eligible state employees and retirees.

Active Members*

Plan Provision	Requirement
<ul style="list-style-type: none"> Basic life insurance An amount equal to one times annual salary (with a minimum of \$15,000) while actively employed. 	<ul style="list-style-type: none"> Actively employed in an eligible state position resulting in membership in MOSERS.
<ul style="list-style-type: none"> Duty-related death benefit Duty-related death benefit equivalent to two times the annual salary the member was earning at the time of death in addition to the basic life insurance amount of one times annual salary. 	<ul style="list-style-type: none"> Actively employed in an eligible state position resulting in membership in MOSERS.
<ul style="list-style-type: none"> Optional life insurance Additional life insurance may be purchased in a flat amount in multiples of \$10,000 not to exceed the maximum (lesser of six times annual salary or \$800,000). Spouse coverage may be purchased in multiples of \$10,000 up to a maximum of \$100,000; however, the amount of spouse coverage cannot exceed the amount of optional life insurance coverage the member has purchased. Coverage for children is available in a flat amount of \$10,000 per child. 	<ul style="list-style-type: none"> Actively employed in an eligible state position resulting in membership in MOSERS.

* Terminating employees may port or convert coverage up to the amount they had as an active employee at individual rates. Not available to employees of the Department of Conservation and universities except Lincoln University and State Technical College of Missouri.

Retired Members

Plan Provision	Requirement
<ul style="list-style-type: none"> Basic life insurance at retirement \$5,000 basic life insurance during retirement. 	<ul style="list-style-type: none"> Must retire directly from active employment.
<ul style="list-style-type: none"> Optional life insurance at retirement (MSEP) A member may retain up to the lesser of \$60,000 or the amount of optional life insurance coverage held at the time of retirement at the group rate and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> Must retire directly from active employment.
<ul style="list-style-type: none"> Optional life insurance at retirement (MSEP 2000) Under "Rule of 80", a member may retain the current amount of coverage prior to retirement until age 62, at which time coverage is reduced to \$60,000, and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> Must retire directly from active employment.
<ul style="list-style-type: none"> Optional life insurance at retirement (MSEP 2011) Under "Rule of 90", a member may retain the current amount of coverage prior to retirement until age 62, at which time coverage is reduced to \$60,000, and may convert any remaining basic and optional life insurance at individual rates. Coverage for spouse ends at member's retirement and may be converted at individual rates. 	<ul style="list-style-type: none"> Must retire directly from active employment.

Note: Insured employees may port or convert their life insurance and their dependent life insurance when their coverage has been reduced or terminated if they meet certain qualifications.

Long-Term Disability (LTD) Insurance Plans

June 30, 2023

MOSERS administers the LTD Plan for eligible state employees who become disabled during active employment.

Active Members

Classification	Requirement
<ul style="list-style-type: none"> General state employees, legislators, and elected state officials Members of MOSERS in a position normally requiring at least 1,040 hours of work per year are covered under the LTD plan, unless they work for a state agency which has its own LTD plan. 	<ul style="list-style-type: none"> Eligible participants receive 60% of their compensation minus primary Social Security, Workers' Compensation, and employer provided income. Benefits commence after 90 days of disability or when sick leave benefits are no longer payable, whichever occurs last. LTD benefits cease upon the earliest of (i) when disability ends, (ii) when the member is first eligible for normal retirement benefits or is receiving early retirement benefits, (iii) upon a member's death, (iv) the date benefits become payable under any other group long-term disability insurance plan, or (v) the date the member fails to provide proof of continued disability and entitlement to LTD benefits. In addition to any of the reasons listed above, LTD monthly benefits for legislators and statewide elected officials will end when the total credited service accrued as a legislator or a statewide elected official, either through active employment and/or while on long-term disability, equals the corresponding constitutional service limitations. (i.e. term limits)
<ul style="list-style-type: none"> Water patrol 	<ul style="list-style-type: none"> Uniformed members who are eligible for statutory occupational disability receive benefits equal to 50% of compensation with no offset for Social Security at the time of disability. For nonoccupational disabilities, eligible participants receive the same benefit as general employees.
<ul style="list-style-type: none"> Judges 	<ul style="list-style-type: none"> In addition to the disability benefits provided to general employees, judges may receive benefits under the state constitution. Participants may receive 50% of salary until the current term expires.

Changes in Plan Provisions

The 2023 legislative session ended on May 12th. There were three bills passed by the General Assembly and signed by the Governor that directly impact MOSERS. These include:

House Bill 5 - The General Assembly authorized the Office of Administration's appropriation of \$718 million to MOSERS for fiscal year 2024. This appropriation funds the Board-certified employer contribution rate. This amount was generated from the employer contribution rates calculated in the annual actuarial valuations performed by MOSERS' retained actuarial professionals and certified by the MOSERS Board of Trustees at its September 2022 Board meeting.

Additionally, **Senate Bill 20** and **Senate Bill 75**, which contain the MOSERS clean-up provisions, took effect on August 28, 2023. Generally, the changes in these bills are administrative in nature and intended to clarify and/or eliminate inconsistencies in the law. Some other notable parts relative to MOSERS include:

- Limiting the amount of service credit a member of the General Assembly or Statewide Elected Official can accrue while on long-term disability to be consistent with constitutional term limits;
- Removing the statutory requirement that payment of the System's unfunded liabilities be determined using the level percent of payroll amortization method, which allows—but does not require—the Board to calculate the annual employer contribution using a different amortization method;
- Changing the interest associated with employee contributions within the Judicial 2011 plan from a fixed 4% to the 52-week Treasury bill rate, consistent with changes made in 2012 for general state employees; and
- Allowing a member to receive a monthly retirement benefit from MOSERS while serving as a member of the General Assembly or while holding an elected statewide office.

Actuarial Present Values

June 30, 2023

MSEP

Actuarial Present Value June 30, 2023	Actuarial Present Value	Portion Covered by Future Normal Cost Contributions	Actuarial Accrued Liabilities
Active members			
Service retirement benefits based on services rendered before and likely to be rendered after valuation date	\$ 5,805,573,752	\$ 775,000,690	\$ 5,030,573,062
Disability benefits likely to be paid to present active members who become totally and permanently disabled	114,056,468	65,773,124	48,283,344
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	67,392,373	19,977,778	47,414,595
Separation benefits likely to be paid to present active members	417,419,881	322,388,061	95,031,820
Active member totals	\$ 6,404,442,474	\$ 1,183,139,653	5,221,302,821
Members on leave of absence & LTD			
Service retirement benefits based on services rendered before the valuation date			66,049,220
Inactive-vested members			
Service retirement benefits based on services rendered before the valuation date			920,233,637
Retired lives			9,939,272,500
Pending refunds			43,955,508
Total actuarial accrued liability			16,190,813,686
Less: actuarial value of assets			9,331,207,050
Unfunded actuarial accrued liability			\$ 6,859,606,636
Funded ratio			57.6%

Actuarial Present Values

June 30, 2023

Judicial Plan

Actuarial Present Value June 30, 2023	Actuarial Present Value	Portion Covered by Future Normal Cost Contributions	Actuarial Accrued Liabilities
Active members			
Service retirement benefits based on services rendered before and likely to be rendered after valuation date	\$ 238,734,515	\$ 82,655,615	\$ 156,078,900
Survivor benefits likely to be paid to widows/widowers and children of present active members who die before retiring	4,656,119	3,477,890	1,178,229
Separation benefits likely to be paid to present active members	16,570,671	14,954,179	1,616,492
Active member totals	\$ 259,961,305	\$ 101,087,684	158,873,621
Inactive-vested members			13,684,122
Retired lives			481,684,580
Total actuarial accrued liability			654,242,323
Less: actuarial value of assets			207,085,203
Unfunded actuarial accrued liability			\$ 447,157,120
Funded ratio			31.7%

This page intentionally left blank.



STATISTICAL SECTION

Maintain the strong foundation built by the many talented and dedicated individuals who have nurtured the fund and protected its resources since its establishment in 1957.

Overview

The *Statistical Section* presents detailed information as a context for understanding what the information in the *Financial Statements*, note disclosures, and *Required Supplementary Information* says about MOSERS' overall financial health.

Financial Trends Information

- *Changes in Fiduciary Net Position* – This schedule presents financial trend information for the most recent ten fiscal years.
- *Deductions from Net Position for Benefits and Refunds by Type* – This information is intended to help the reader assess how benefit payments have changed over time.
- *Valuation Assets (Smoothed Market) vs. Pension Liabilities* – This information is intended to help the reader assess how MOSERS' funded status has changed over time.

Revenues Information

- *Required Employer Contribution Rates as a Percent of Payroll* – This information is intended to help the reader assess how MOSERS' contribution requirements have changed over time.

Operating & Economic Information

- *Membership in Retirement Plans* – This information is intended to help the reader assess how MOSERS' membership has changed over time.
- *Distribution of Benefit Recipients by Location* – This information is intended to help the reader evaluate where MOSERS distributes annuity payments.
- *Benefit Recipients by Type of Retirement and Option Elected* – This information is intended to help the reader understand the stratification of benefit payments by amount and elected option.
- *Benefits Tabulated by Type of Benefit and by Option* – This information is intended to help the reader understand the actuarially determined annual and average monthly benefit amounts by benefit type and option.
- *Average Monthly Benefit Amounts* – This information is intended to help the reader evaluate how benefit payments have changed over time. Figures have been stratified based on years of credited service.
- *Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement* – This information is intended to help the reader understand how long current retirees have been in retirement.
- *Benefits Tabulated by Attained Ages of Benefit Recipients* – This information is intended to help the reader understand the actuarially determined annual and average monthly benefit amounts by type of recipient, and age of recipient.
- *Principal Participating Employers* – This information is intended to help the reader understand MOSERS' most significant sources of contribution revenue, and how it has changed over time.

Changes in Fiduciary Net Position

Last Ten Fiscal Years

	2023	2022	2021	2020	2019
MSEP					
Additions					
Employer contributions	\$ 582,381,146	\$ 471,302,256	\$ 463,293,368	\$ 436,895,653	\$ 394,150,042
Additional state contribution	500,000,000	0	0	0	0
Employee contributions	48,487,731	39,809,873	37,571,263	35,141,960	31,286,632
Member service purchases	1,591,102	2,119,195	1,520,330	1,388,992	1,293,774
Service transfers in	3,573,592	3,494,626	2,298,914	2,664,796	2,592,737
Prepaid employer contributions discount	(1,719,767)	0	0	0	0
Investment income (net of expenses)	177,598,790	(816,407,543)	2,032,991,086	400,354,303	313,159,178
Other	646	5,852	80,121	133,952	496,898
Total additions to plan net position	1,311,913,240	(299,675,741)	2,537,755,082	876,579,656	742,979,261
Deductions					
Benefit payments	979,142,541	949,501,630	911,424,269	864,807,554	842,813,907
Contribution refunds	7,981,346	8,417,124	5,894,157	5,224,489	6,006,484
Service transfers out	4,426,152	4,672,072	2,520,166	3,784,195	3,001,189
Administrative expenses	10,984,550	9,248,916	8,816,943	8,398,164	9,200,826
Total deductions from plan net position	1,002,534,589	971,839,742	928,655,535	882,214,402	861,022,406
Change in net position	\$ 309,378,651	\$ (1,271,515,483)	\$ 1,609,099,547	\$ (5,634,746)	\$ (118,043,145)
Judicial Plan					
Additions					
Employer contributions	\$ 39,064,758	\$ 39,228,848	\$ 39,996,509	\$ 39,174,515	\$ 38,604,668
Employee contributions	1,746,913	1,550,712	1,448,428	1,314,570	1,138,101
Investment income (net of expenses)	4,165,663	(18,801,946)	44,049,707	8,162,709	6,051,941
Other	0	0	0	0	3,895
Total additions to plan net position	44,977,334	21,977,614	85,494,644	48,651,794	45,798,605
Deductions					
Benefit payments	45,108,589	42,513,238	41,625,546	39,622,268	37,585,484
Contribution refunds	0	17,140	0	0	7,565
Administrative expenses	91,076	79,492	75,822	74,450	72,141
Total deductions from plan net position	45,199,665	42,609,870	41,701,368	39,696,718	37,665,190
Change in net position	\$ (222,331)	\$ (20,632,256)	\$ 43,793,276	\$ 8,955,076	\$ 8,133,415
Insurance Activities					
Additions					
Premium receipts	\$ 31,755,533	\$ 29,924,611	\$ 31,609,219	\$ 32,582,558	\$ 31,342,778
Investment income	87,335	4,258	1,869	46,539	121,298
Miscellaneous income	480,120	480,120	480,074	484,075	494,722
Total operating revenues	32,322,988	30,408,989	32,091,162	33,113,172	31,958,798
Deductions					
Premium disbursements	31,737,102	29,896,004	31,597,820	32,549,567	31,325,399
Premium refunds	18,370	28,608	11,401	32,991	17,379
Administrative expenses	480,119	480,122	480,120	480,120	501,018
Total deductions from net position	32,235,591	30,404,734	32,089,341	33,062,678	31,843,796
Change in net position	\$ 87,397	\$ 4,255	\$ 1,821	\$ 50,494	\$ 115,002

Changes in Net position continued on following page

Changes in Fiduciary Net Position (continued)

Last Ten Fiscal Years

	2018	2017	2016	2015	2014
MSEP					
Additions					
Employer contributions	\$ 379,557,962	\$ 335,217,422	\$ 329,957,369	\$ 329,752,832	\$ 326,370,336
Additional state contribution	0	0	0	0	0
Employee contributions	28,303,993	25,439,343	21,684,920	18,099,455	14,025,328
Member service purchases	2,020,720	1,691,046	2,815,749	1,859,005	2,909,423
Service transfers in	3,297,251	3,977,803	2,107,873	3,575,815	2,252,206
Prepaid employer contributions discount	0	0	0	0	0
Investment income (net of expenses)	578,883,501	272,073,643	1,194,422	(237,603,530)	1,484,709,539
Other	538,600	522,025	545,847	533,001	450,453
Total additions to plan net position	992,602,027	638,921,282	358,306,180	116,216,578	1,830,717,285
Deductions					
Benefit payments	879,148,738	787,300,328	750,440,412	723,994,041	677,097,411
Contribution refunds	5,502,698	4,820,737	3,798,199	2,479,264	1,421,856
Service transfers out	2,060,037	1,843,792	3,071,892	1,792,495	1,916,840
Administrative expenses	10,024,178	8,759,341	8,489,375	8,077,692	7,336,922
Total deductions from plan net position	896,735,651	802,724,198	765,799,878	736,343,492	687,773,029
Change in net position	\$ 95,866,376	\$ (163,802,916)	\$ (407,493,698)	\$ (620,126,914)	\$ 1,142,944,256
Judicial Plan					
Additions					
Employer contributions	\$ 36,892,203	\$ 34,246,826	\$ 33,642,497	\$ 32,696,686	\$ 29,264,877
Employee contributions	902,320	786,745	661,206	488,193	294,810
Investment income (net of expenses)	10,727,603	4,671,168	19,273	(3,618,469)	21,388,261
Other	9,981	8,963	8,808	8,117	6,489
Total additions to plan net position	48,532,107	39,713,702	34,331,784	29,574,527	50,954,437
Deductions					
Benefit payments	35,651,489	33,979,837	32,979,706	31,245,906	29,406,625
Contribution refunds	5,760	4,888	10,008	0	0
Administrative expenses	185,763	150,387	136,983	123,015	105,693
Total deductions from plan net position	35,843,012	34,135,112	33,126,697	31,368,921	29,512,318
Change in net position	\$ 12,689,095	\$ 5,578,590	\$ 1,205,087	\$ (1,794,394)	\$ 21,442,119
Insurance Activities					
Additions					
Premium receipts	\$ 31,119,232	\$ 28,779,398	\$ 30,360,162	\$ 30,177,918	\$ 29,563,054
Investment income	79,389	33,984	15,207	9,749	11,886
Miscellaneous income	480,120	480,120	480,120	(519,880)	1,480,120
Total operating revenues	31,678,741	29,293,502	30,855,489	29,667,787	31,055,060
Deductions					
Premium disbursements	31,100,612	28,769,588	30,328,802	30,157,271	29,544,110
Premium refunds	14,211	9,810	31,360	20,646	18,942
Administrative expenses	526,023	532,169	550,843	516,782	435,830
Total deductions from net position	31,640,846	29,311,567	30,911,005	30,694,699	29,998,882
Change in net position	\$ 37,895	\$ (18,065)	\$ (55,516)	\$ (1,026,912)	\$ 1,056,178

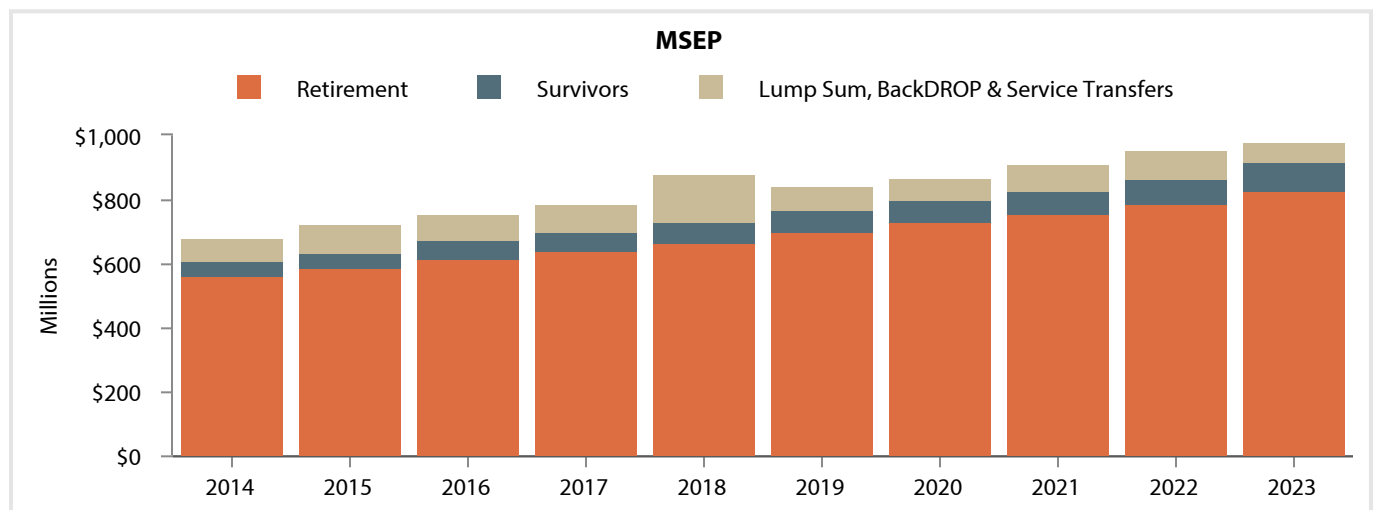
Deductions from Net Position for Benefits and Refunds by Type

Last Ten Fiscal Years

MSEP

Type of benefit	2014	2015	2016	2017	2018
Retirement	\$ 560,553,490	\$ 586,597,187	\$ 615,708,229	\$ 640,637,749	\$ 670,663,932
Survivors	49,922,170	52,940,062	56,495,787	59,628,687	63,081,129
Disability	22,468	16,857	15,470	14,821	5,223
Lump-sum	286,184	57,525	267,198	123,005	61,041,258
BackDROP	66,313,097	84,382,410	77,953,728	86,896,066	84,357,196
Service transfers	1,916,840	1,792,495	3,071,892	1,843,792	2,060,037
Total benefits	\$ 679,014,249	\$ 725,786,536	\$ 753,512,304	\$ 789,144,120	\$ 881,208,775
Refunds - separation of service	\$ 1,409,958	\$ 2,435,771	\$ 3,750,757	\$ 4,777,245	\$ 5,396,418
Refunds - death	11,898	43,493	47,442	43,492	106,280
Total contribution refunds	\$ 1,421,856	\$ 2,479,264	\$ 3,798,199	\$ 4,820,737	\$ 5,502,698

Type of benefit	2019	2020	2021	2022	2023
Retirement	\$ 703,117,097	\$ 730,310,371	\$ 757,076,179	\$ 789,168,797	\$ 831,847,718
Survivors	66,493,496	70,583,387	74,890,437	79,635,271	85,388,069
Disability	2,260	2,300	2,328	1,171	0
Lump-sum	318,656	245,297	92,059	695,778	72,129
BackDROP	72,882,398	63,666,199	79,363,265	80,000,613	61,834,625
Service transfers	3,001,189	3,784,195	2,520,166	4,672,072	4,426,152
Total benefits	\$ 845,815,096	\$ 868,591,749	\$ 913,944,434	\$ 954,173,702	\$ 983,568,693
Refunds - separation of service	\$ 5,930,152	\$ 5,143,987	\$ 5,704,491	\$ 8,257,062	\$ 7,687,393
Refunds - death	76,332	80,502	189,666	160,062	293,953
Total contribution refunds	\$ 6,006,484	\$ 5,224,489	\$ 5,894,157	\$ 8,417,124	\$ 7,981,346



Source: MOSERS' financial records

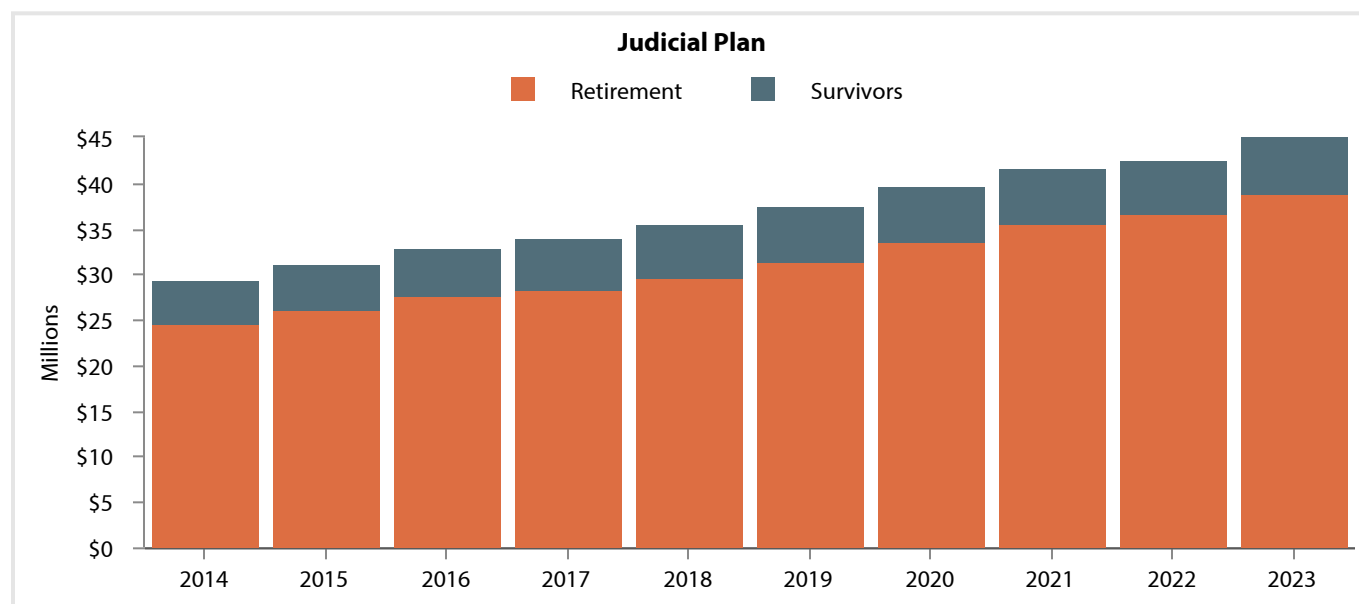
Deductions from Net Position for Benefits and Refunds by Type (continued)

Last Ten Fiscal Years

Judicial Plan

Type of benefit	2014	2015	2016	2017	2018
Retirement	\$ 24,609,421	\$ 26,181,505	\$ 27,641,108	\$ 28,304,733	\$ 29,655,995
Survivors	4,797,204	5,064,400	5,338,598	5,675,104	5,995,494
Total benefits	\$ 29,406,625	\$ 31,245,905	\$ 32,979,706	\$ 33,979,837	\$ 35,651,489
Refunds - separation of service	\$ 0	\$ 0	\$ 10,008	\$ 4,888	\$ 5,760

Type of benefit	2019	2020	2021	2022	2023
Retirement	\$ 31,463,475	\$ 33,577,616	\$ 35,487,401	\$ 36,654,586	\$ 38,962,752
Survivors	6,122,009	6,044,652	6,138,145	5,858,652	6,145,837
Total benefits	\$ 37,585,484	\$ 39,622,268	\$ 41,625,546	\$ 42,513,238	\$ 45,108,589
Refunds - separation of service	\$ 7,565	\$ 0	\$ 0	\$ 17,140	\$ 0



Source: MOSERS' financial records

Pension Trust Funds

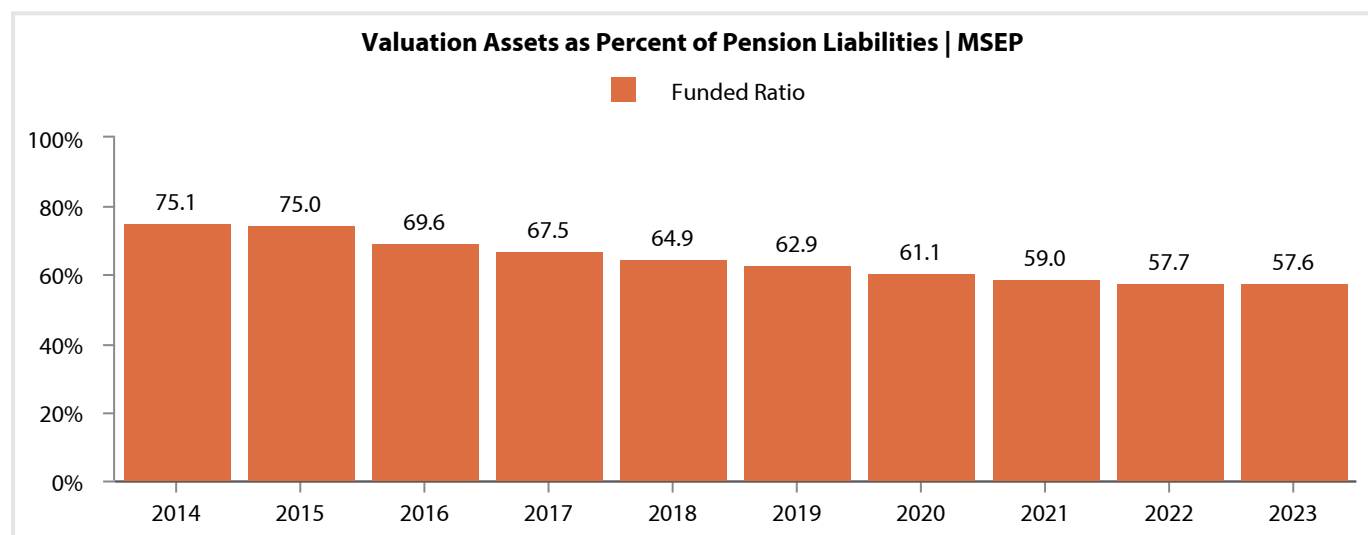
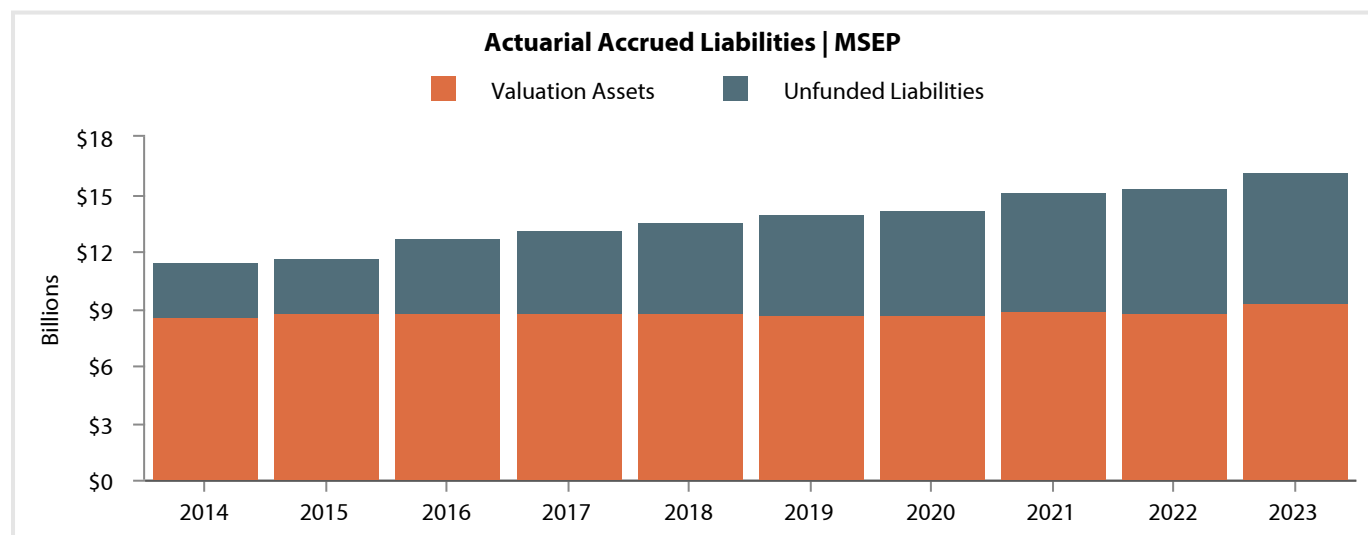
Valuation Assets (Smoothed Market) vs. Pension Liabilities

Last Ten Fiscal Years

MSEP

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2014	\$8.6378	\$2.8568	\$11.4946	75.1%
2015	8.7925	2.9351	11.7276	75.0
2016	8.8781	3.8731	12.7512	69.6
2017	8.8724	4.2799	13.1523	67.5
2018	8.8304	4.7824	13.6128	64.9
2019	8.7824	5.1752	13.9576	62.9
2020	8.7112	5.5472	14.2584	61.1
2021	8.9093	6.2014	15.1106	59.0
2022	8.8943	6.5147	15.4090	57.7
2023	9.3312	6.8596	16.1908	57.6



Source: MOSERS' MSEP Actuarial Valuation Reports, most recent 10 years

Pension Trust Funds

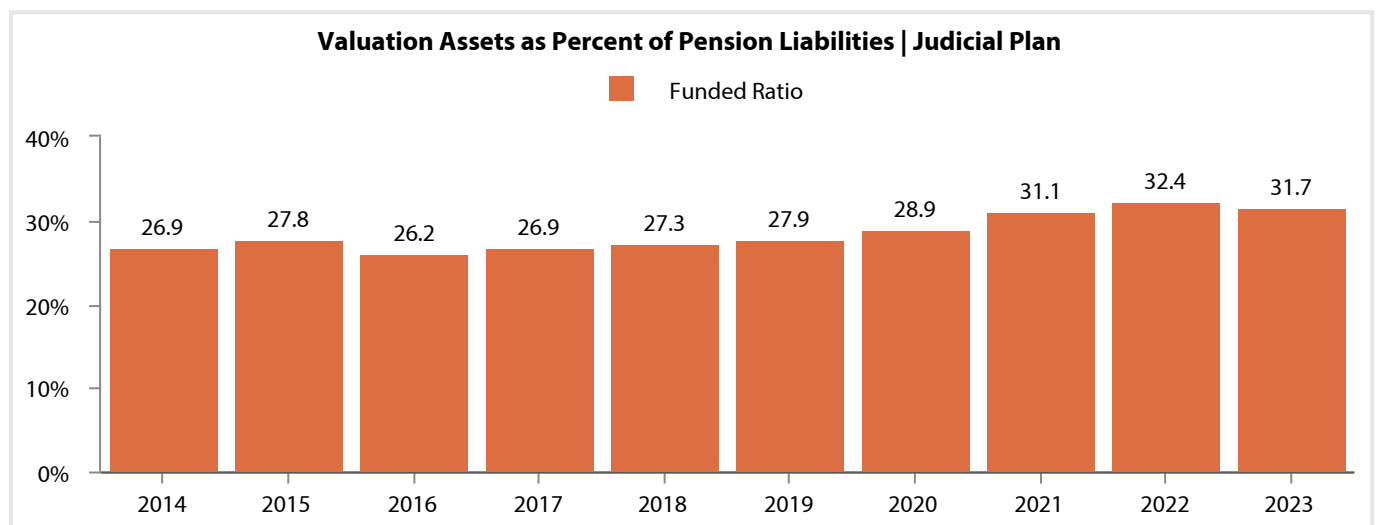
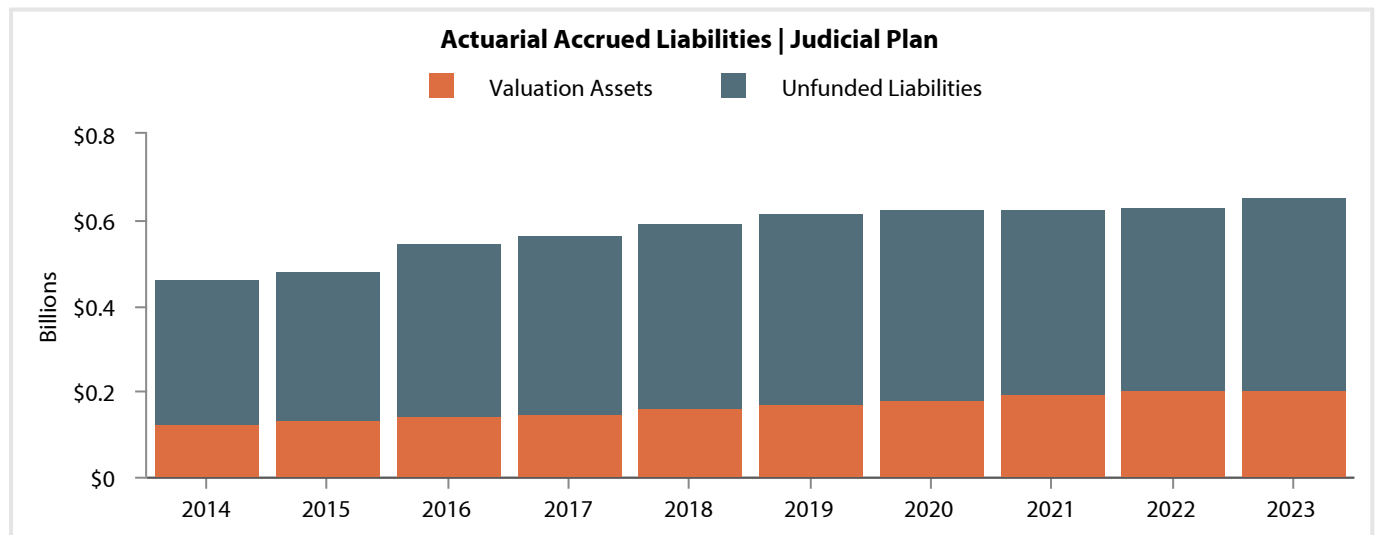
Valuation Assets (Smoothed Market) vs. Pension Liabilities (continued)

Last Ten Fiscal Years

Judicial Plan

Dollars in Billions

Fiscal Year	Valuation Assets	Unfunded Liabilities	Accrued Liabilities	Funded Ratio
2014	\$0.1243	\$0.3381	\$0.4623	26.9%
2015	0.1343	0.3486	0.4830	27.8
2016	0.1435	0.4042	0.5476	26.2
2017	0.1518	0.4126	0.5644	26.9
2018	0.1621	0.4317	0.5938	27.3
2019	0.1722	0.4453	0.6175	27.9
2020	0.1807	0.4441	0.6248	28.9
2021	0.1950	0.4313	0.6263	31.1
2022	0.2040	0.4260	0.6300	32.4
2023	0.2071	0.4472	0.6542	31.7



Source: MOSERS' Judicial Plan Actuarial Valuation Reports, most recent 10 years

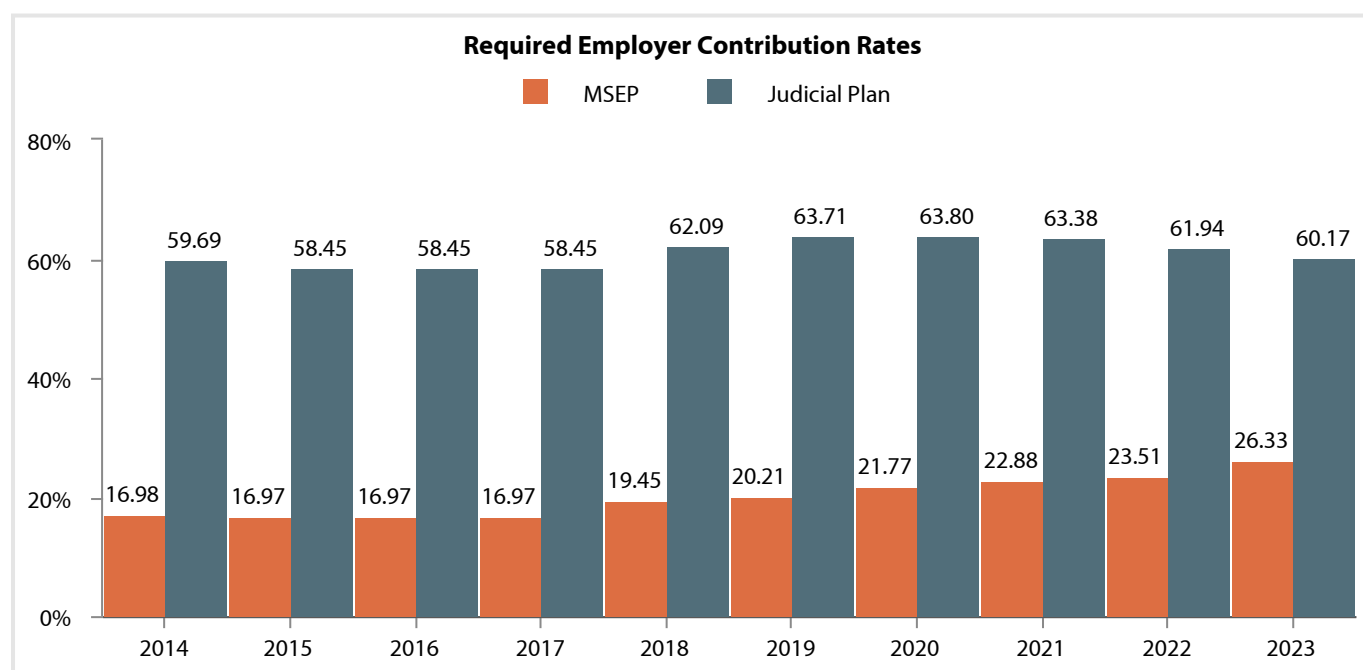
Pension Trust Funds

Required Employer Contribution Rates as a Percent of Payroll

Last Ten Fiscal Years

Fiscal Year	MSEP	Judicial
2014	16.98%	59.69%
2015	16.97	58.45
2016	16.97	58.45
2017	16.97	58.45
2018	19.45	62.09
2019	20.21	63.71
2020	21.77	63.80
2021	22.88	63.38
2022	23.51	61.94
2023	26.33	60.17

Note: In addition to the employer contribution rates, MOSERS also receives a fixed 4% employee contribution from MSEP 2011 and Judicial Plan 2011 members. Beginning in fiscal year 2023, the employers were given the option to prepay contributions at certain times during the year and receive an actuarially determined present value discount based on MOSERS' investment return assumption. Amounts are before any prepaid discounts.



Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports, most recent 10 years

Membership in Retirement Plans

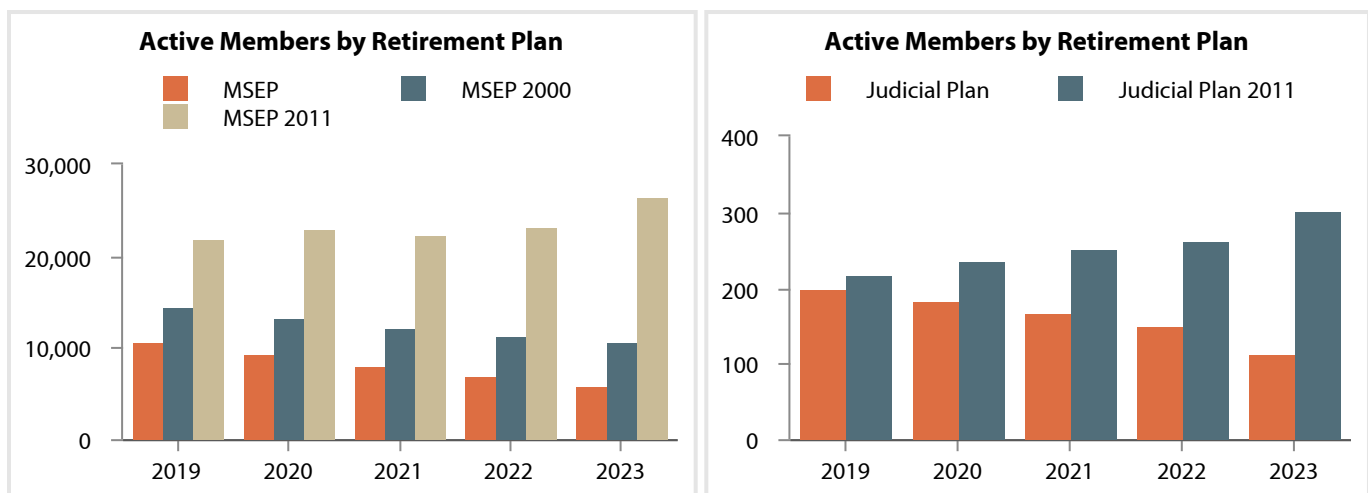
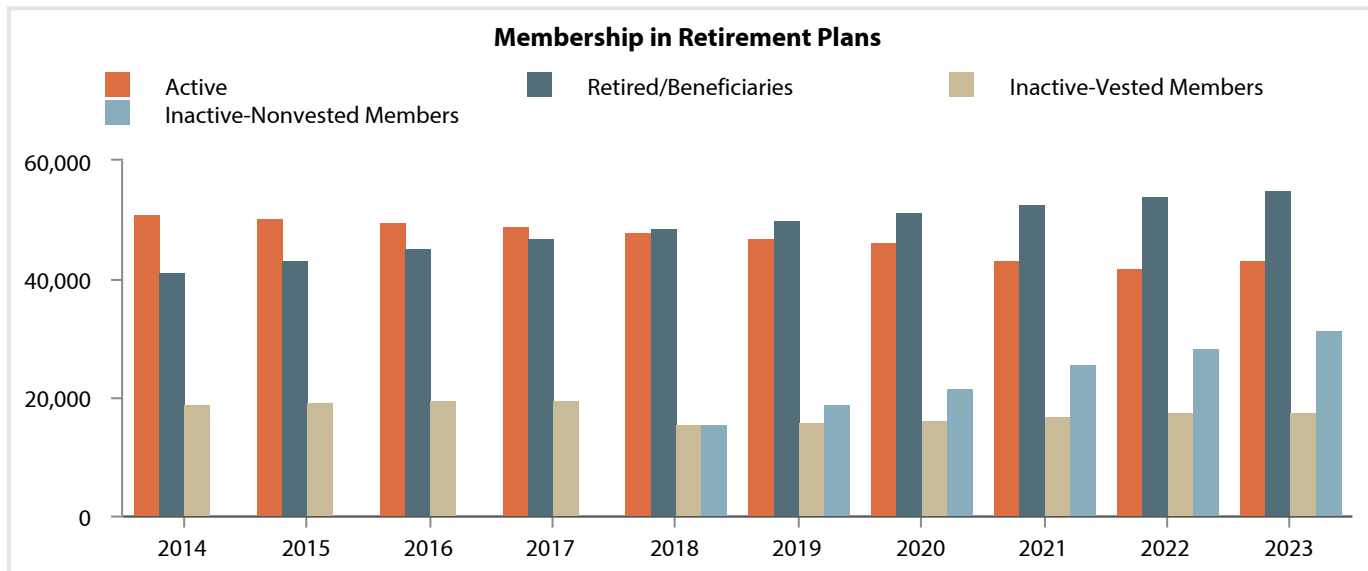
Last Ten Fiscal Years

MSEP & Judicial Plans Combined

Fiscal Year	Active Members	Retirees and Beneficiaries	Inactive-Vested Members*	Inactive-Nonvested Members**	Totals
2014	51,026	41,511	18,957		111,494
2015	50,385	43,503	19,319		113,207
2016	49,872	45,368	19,538		114,778
2017	49,320	47,119	19,603		116,042
2018	48,221	48,776	15,502	15,619	128,118
2019	47,278	50,281	16,052	18,852	132,463
2020	46,417	51,447	16,335	21,735	135,934
2021	43,247	52,830	16,986	25,613	138,676
2022	42,010	54,244	17,465	28,444	142,163
2023	43,503	55,328	17,683	31,575	148,089

* Excludes members on leave of absence and long-term disability.

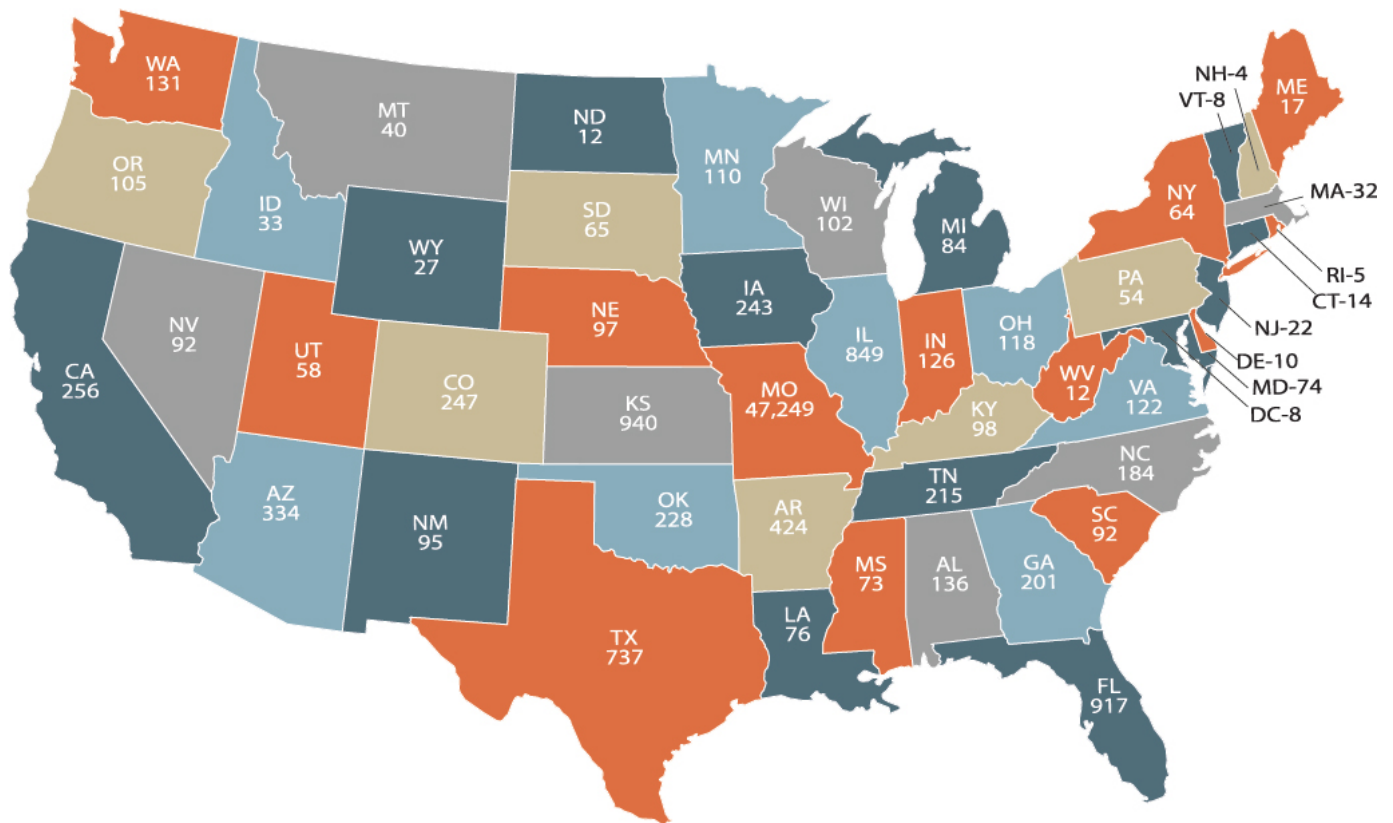
** Inactive-nonvested members of the MSEP 2011 who have not requested a refund of their contributions are now being included in the membership data.



Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports, most recent 10 years

Distribution of Benefit Recipients by Location

June 30, 2023



Benefit Recipients Outside the Continental United States

22 Alaska	1 Ecuador	1 Northern Mariana Islands
15 Hawaii	2 Guam	3 Puerto Rico
2 APO	1 Germany	1 Philippines
1 Argentina	1 Hong Kong	1 Spain
2 Australia	1 Israel	1 Sweden
1 Belgium	3 Italy	2 Thailand
13 Canada	1 Latvia	4 United Kingdom
1 Costa Rica	1 Mexico	5 Virgin Islands
1 Czech Republic	1 Marshall Islands	

Source: MOSERS' Pension Administration System

Benefit Recipients by Type of Retirement and Option Elected

June 30, 2023

MSEP

Amount of Monthly Benefit	Number of Benefit Recipients	Type of Retirement			
		Normal Retirement	Early Retirement	Survivor of Active	Survivor of Retired
1-500	13,509	6,023	5,548	619	1,319
501-1000	11,434	7,141	2,487	523	1,283
1001-1500	9,719	8,044	664	269	742
1501-2000	7,100	6,384	192	139	385
2001-2500	4,688	4,311	66	87	224
2501-3000	3,017	2,797	27	43	150
3001-3500	1,763	1,609	12	32	110
3501-4000	1,136	1,047	11	14	64
Over 4000	2,343	2,101	8	36	198
Total	54,709	39,457	9,015	1,762	4,475

Amount of Monthly Benefit	Option Elected							
	1	2	3	4	5	6	7	8
1-500	37	554	561	1,697	0	3,105	62	7,493
501-1000	44	317	240	2,480	2	2,538	26	5,787
1001-1500	25	155	116	2,427	0	2,334	3	4,659
1501-2000	18	105	53	1,774	0	1,522	2	3,626
2001-2500	6	56	35	1,199	0	1,086	1	2,305
2501-3000	8	23	17	837	0	738	0	1,394
3001-3500	3	12	9	471	0	481	0	787
3501-4000	1	14	0	318	0	313	0	490
Over 4000	9	16	7	726	0	815	0	770
Total	151	1,252	1,038	11,929	2	12,932	94	27,311

Option Elected

- 1 - Life Income with 60 Guaranteed Payments
- 2 - Life Income with 120 Guaranteed Payments
- 3 - Life Income with 180 Guaranteed Payments
- 4 - Joint & 50% Survivor
- 5 - Joint & 75% Survivor
- 6 - Joint & 100% Survivor
- 7 - Automatic Minor Survivor
- 8 - No Survivor Option (includes pop-ups)

Source: MOSERS' MSEP Plan Actuarial Valuation Report as of June 30, 2023

Benefit Recipients by Type of Retirement and Option Elected (continued)

June 30, 2023

Judicial Plan

Amount of Monthly Benefit	Number of Benefit Recipients	Type of Retirement			
		Normal Retirement	Early Retirement	Survivor of Active	Survivor of Retired
1-500	7	0	3	0	4
501-1000	10	0	7	0	3
1001-1500	9	0	5	2	2
1501-2000	12	1	7	1	3
2001-2500	9	0	3	2	4
2501-3000	19	0	6	4	9
3001-3500	40	0	10	11	19
3501-4000	45	1	8	7	29
Over 4000	468	386	32	4	46
Total	619	388	81	31	119

Amount of Monthly Benefit	Option Elected							
	1	2	3	4	5	6	7	8
1-500	0	0	0	7	0	0	0	0
501-1000	0	0	0	10	0	0	0	0
1001-1500	0	0	0	6	0	1	0	2
1501-2000	0	0	0	12	0	0	0	0
2001-2500	0	0	0	9	0	0	0	0
2501-3000	0	0	0	19	0	0	0	0
3001-3500	0	0	0	36	0	0	0	4
3501-4000	0	0	0	44	0	1	0	0
Over 4000	0	0	1	460	0	1	1	5
Total	0	0	1	603	0	3	1	11

Option Elected

- 1 - Life Income with 60 Guaranteed Payments
- 2 - Life Income with 120 Guaranteed Payments
- 3 - Life Income with 180 Guaranteed Payments
- 4 - Joint & 50% Survivor
- 5 - Joint & 75% Survivor
- 6 - Joint & 100% Survivor
- 7 - Automatic Minor Survivor
- 8 - No Survivor Option (includes pop-ups)

Source: MOSERS' Judicial Plan Actuarial Valuation Report as of June 30, 2023

Benefits Tabulated by Type of Benefit and by Option

June 30, 2023

MSEP Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	27,275	\$ 430,487,004	\$ 15,783
Joint & 50% survivor	9,818	219,028,824	22,309
Joint & 100% survivor	9,230	177,790,008	19,262
Life income with 60 guaranteed payments	150	2,563,668	17,091
Life income with 120 guaranteed payments	1,144	12,469,464	10,900
Life income with 180 guaranteed payments	855	7,698,816	9,004
Survivor beneficiary	4,475	66,047,016	14,759
Total	52,947	916,084,800	17,302
Death-in-service	1,762	21,764,556	12,352
Grand totals	54,709	\$ 937,849,356	17,143

Judicial Plan Combined

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	7	\$ 460,548	\$ 65,793
Joint & 50% survivor	459	40,137,288	87,445
Joint & 100% survivor	3	119,820	39,940
Survivor beneficiary	119	5,111,004	42,950
Total	588	45,828,660	77,940
Death-in-service	31	1,188,276	38,331
Grand totals	619	\$ 47,016,936	75,956

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2023

Benefits Tabulated by Type of Benefit and by Option (continued)

June 30, 2023

MSEP (Closed Plan)

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	5,743	\$ 107,247,840	\$ 18,675
Unreduced joint & 50% survivor	4,920	115,274,328	23,430
Joint & 100% survivor	3,090	78,460,500	25,392
Life income with 60 guaranteed payments	137	2,371,764	17,312
Life income with 120 guaranteed payments	174	2,415,252	13,881
Survivor beneficiary	2,755	47,557,692	17,262
Total	16,819	353,327,376	21,008
Death-in-service	1,355	19,266,072	14,219
Grand totals	18,174	\$ 372,593,448	20,501

MSEP 2000

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	21,134	\$ 321,377,232	\$ 15,207
Joint & 50% survivor	4,844	103,487,016	21,364
Joint & 100% survivor	5,988	98,597,364	16,466
Life income with 60 guaranteed payments	13	191,904	14,762
Life income with 120 guaranteed payments	944	9,930,072	10,519
Life income with 180 guaranteed payments	818	7,520,100	9,193
Survivor beneficiary	1,712	18,464,292	10,785
Total	35,453	559,567,980	15,783
Death-in-service	371	2,327,304	6,273
Grand totals	35,824	\$ 561,895,284	15,685

MSEP 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	398	\$ 1,861,932	\$ 4,678
Joint & 50% survivor	54	267,480	4,953
Joint & 100% survivor	152	732,144	4,817
Life income with 120 guaranteed payments	26	124,140	4,775
Life income with 180 guaranteed payments	37	178,716	4,830
Survivor beneficiary	8	25,032	3,129
Total	675	3,189,444	4,725
Death-in-service	36	171,180	4,755
Grand totals	711	\$ 3,360,624	4,727

Benefits Tabulated by Type of Benefit and by Option (continued)

June 30, 2023

Judicial Plan

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	4	\$ 332,460	\$ 83,115
Joint & 50% survivor	456	39,976,980	87,669
Survivor beneficiary	118	5,042,916	42,737
Total	578	45,352,356	78,464
Death-in-service	28	1,105,392	39,478
Grand totals	606	\$ 46,457,748	76,663

Judicial Plan 2011

Type of Benefit	Number	Annual Benefits	Average Annual Benefits
Service retirement			
Life income annuity	3	\$ 128,088	\$ 42,696
Joint & 50% survivor	3	160,308	53,436
Joint & 100% survivor	3	119,820	39,940
Survivor beneficiary	1	68,088	68,088
Total	10	476,304	47,630
Death-in-service	3	82,884	27,628
Grand totals	13	\$ 559,188	43,014

Source: MOSERS' MSEP and Judicial Plan Actuarial Valuation Reports as of June 30, 2023

Average Monthly Benefit Amounts

Last Ten Fiscal Years

MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 280	\$ 308	\$ 520	\$ 809	\$ 1,199	\$ 1,691	\$ 2,207	\$ 937
	Average final salary	\$ 4,426	\$ 2,675	\$ 2,614	\$ 3,029	\$ 3,229	\$ 3,650	\$ 3,999	\$ 3,066
	Number of retirees	5	636	507	370	436	392	199	2,545
2015	Average monthly benefit	\$ 219	\$ 315	\$ 522	\$ 801	\$ 1,268	\$ 1,723	\$ 2,217	\$ 999
	Average final salary	\$ 5,058	\$ 2,596	\$ 2,624	\$ 2,954	\$ 3,416	\$ 3,729	\$ 4,016	\$ 3,119
	Number of retirees	6	644	519	437	450	487	250	2,793
2016	Average monthly benefit	\$ 151	\$ 307	\$ 506	\$ 819	\$ 1,300	\$ 1,838	\$ 2,360	\$ 1,016
	Average final salary	\$ 3,284	\$ 2,623	\$ 2,600	\$ 3,020	\$ 3,445	\$ 3,968	\$ 4,204	\$ 3,175
	Number of retirees	6	611	502	430	505	423	215	2,692
2017	Average monthly benefit	\$ 309	\$ 339	\$ 562	\$ 946	\$ 1,365	\$ 1,860	\$ 2,391	\$ 1,116
	Average final salary	\$ 4,658	\$ 2,731	\$ 2,849	\$ 3,426	\$ 3,641	\$ 4,030	\$ 4,291	\$ 3,406
	Number of retirees	9	518	508	459	440	477	239	2,650
2018	Average monthly benefit	\$ 402	\$ 338	\$ 584	\$ 922	\$ 1,420	\$ 1,887	\$ 2,511	\$ 1,148
	Average final salary	\$ 5,977	\$ 2,815	\$ 2,899	\$ 3,323	\$ 3,802	\$ 4,096	\$ 4,538	\$ 3,488
	Number of retirees	7	523	475	486	520	515	208	2,734
2019	Average monthly benefit	\$ 198	\$ 369	\$ 609	\$ 886	\$ 1,356	\$ 1,840	\$ 2,321	\$ 1,131
	Average final salary	\$ 5,081	\$ 2,907	\$ 2,900	\$ 3,076	\$ 3,637	\$ 3,978	\$ 4,206	\$ 3,390
	Number of retirees	3	484	388	409	456	428	225	2,393
2020	Average monthly benefit	\$ 270	\$ 321	\$ 602	\$ 901	\$ 1,375	\$ 1,822	\$ 2,391	\$ 1,110
	Average final salary	\$ 5,379	\$ 2,677	\$ 3,012	\$ 3,149	\$ 3,707	\$ 3,967	\$ 4,329	\$ 3,390
	Number of retirees	8	475	378	378	447	441	172	2,299
2021	Average monthly benefit	\$ 526	\$ 353	\$ 624	\$ 966	\$ 1,420	\$ 1,952	\$ 2,554	\$ 1,195
	Average final salary	\$ 5,705	\$ 2,763	\$ 3,054	\$ 3,337	\$ 3,798	\$ 4,257	\$ 4,651	\$ 3,561
	Number of retirees	9	481	456	390	568	464	207	2,575
2022	Average monthly benefit	\$ 330	\$ 332	\$ 630	\$ 987	\$ 1,418	\$ 1,934	\$ 2,556	\$ 1,197
	Average final salary	\$ 5,506	\$ 2,822	\$ 3,123	\$ 3,448	\$ 3,772	\$ 4,201	\$ 4,634	\$ 3,584
	Number of retirees	7	576	414	398	579	532	222	2,728
2023	Average monthly benefit	\$ 415	\$ 321	\$ 602	\$ 983	\$ 1,340	\$ 1,970	\$ 2,545	\$ 1,150
	Average final salary	\$ 7,077	\$ 2,857	\$ 3,157	\$ 3,648	\$ 3,773	\$ 4,481	\$ 4,838	\$ 3,679
	Number of retirees	9	527	395	357	485	447	187	2,407
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 330	\$ 329	\$ 572	\$ 901	\$ 1,351	\$ 1,855	\$ 2,401	\$ 1,099
	Average final average salary	\$ 5,330	\$ 2,740	\$ 2,865	\$ 3,238	\$ 3,633	\$ 4,043	\$ 4,360	\$ 3,383
	Number of retirees	69	5,475	4,542	4,114	4,886	4,606	2,124	25,816

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

General Employees in the MSEP*

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 262	\$ 298	\$ 514	\$ 803	\$ 1,195	\$ 1,691	\$ 2,207	\$ 935
	Average final salary	\$ 5,382	\$ 2,663	\$ 2,612	\$ 3,029	\$ 3,230	\$ 3,650	\$ 3,999	\$ 3,065
	Number of retirees	3	629	503	368	435	392	199	2,529
2015	Average monthly benefit	\$ 219	\$ 301	\$ 517	\$ 786	\$ 1,268	\$ 1,723	\$ 2,208	\$ 994
	Average final salary	\$ 5,058	\$ 2,581	\$ 2,623	\$ 2,947	\$ 3,416	\$ 3,729	\$ 4,007	\$ 3,116
	Number of retirees	6	633	517	433	450	487	249	2,775
2016	Average monthly benefit	\$ 151	\$ 297	\$ 506	\$ 819	\$ 1,285	\$ 1,838	\$ 2,343	\$ 1,011
	Average final salary	\$ 3,284	\$ 2,617	\$ 2,600	\$ 3,020	\$ 3,420	\$ 3,968	\$ 4,184	\$ 3,168
	Number of retirees	6	603	502	430	502	423	213	2,679
2017	Average monthly benefit	\$ 230	\$ 313	\$ 551	\$ 934	\$ 1,355	\$ 1,853	\$ 2,379	\$ 1,109
	Average final salary	\$ 5,026	\$ 2,710	\$ 2,839	\$ 3,414	\$ 3,624	\$ 4,016	\$ 4,265	\$ 3,395
	Number of retirees	6	500	504	456	439	476	238	2,619
2018	Average monthly benefit	\$ 220	\$ 329	\$ 577	\$ 921	\$ 1,397	\$ 1,887	\$ 2,511	\$ 1,142
	Average final salary	\$ 5,477	\$ 2,813	\$ 2,889	\$ 3,321	\$ 3,762	\$ 4,096	\$ 4,538	\$ 3,477
	Number of retirees	6	517	474	485	517	515	208	2,722
2019	Average monthly benefit	\$ 198	\$ 340	\$ 594	\$ 868	\$ 1,345	\$ 1,840	\$ 2,321	\$ 1,126
	Average final salary	\$ 5,081	\$ 2,903	\$ 2,885	\$ 3,077	\$ 3,624	\$ 3,978	\$ 4,206	\$ 3,390
	Number of retirees	3	463	384	403	454	428	225	2,360
2020	Average monthly benefit	\$ 237	\$ 307	\$ 597	\$ 901	\$ 1,360	\$ 1,814	\$ 2,391	\$ 1,105
	Average final salary	\$ 5,720	\$ 2,658	\$ 3,012	\$ 3,149	\$ 3,682	\$ 3,952	\$ 4,329	\$ 3,381
	Number of retirees	7	468	376	378	445	440	172	2,286
2021	Average monthly benefit	\$ 467	\$ 319	\$ 616	\$ 958	\$ 1,413	\$ 1,946	\$ 2,542	\$ 1,191
	Average final salary	\$ 5,797	\$ 2,747	\$ 3,055	\$ 3,340	\$ 3,787	\$ 4,245	\$ 4,636	\$ 3,560
	Number of retirees	8	457	452	387	567	463	206	2,540
2022	Average monthly benefit	\$ 300	\$ 326	\$ 627	\$ 987	\$ 1,418	\$ 1,928	\$ 2,556	\$ 1,196
	Average final salary	\$ 5,912	\$ 2,820	\$ 3,123	\$ 3,448	\$ 3,772	\$ 4,189	\$ 4,634	\$ 3,583
	Number of retirees	6	571	413	398	579	531	222	2,720
2023	Average monthly benefit	\$ 313	\$ 302	\$ 575	\$ 976	\$ 1,340	\$ 1,970	\$ 2,545	\$ 1,148
	Average final salary	\$ 7,534	\$ 2,840	\$ 3,146	\$ 3,651	\$ 3,773	\$ 4,481	\$ 4,838	\$ 3,679
	Number of retirees	7	514	386	355	485	447	187	2,381
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 270	\$ 312	\$ 564	\$ 894	\$ 1,342	\$ 1,852	\$ 2,396	\$ 1,095
	Average final average salary	\$ 5,501	\$ 2,728	\$ 2,860	\$ 3,237	\$ 3,620	\$ 4,038	\$ 4,353	\$ 3,378
	Number of retirees	58	5,355	4,511	4,093	4,873	4,602	2,119	25,611

* Excludes legislators, elected officials, water patrol, and administrative law judges.

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Legislators in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 307	\$ 1,051	\$ 1,496	\$ 1,995	\$ 2,744	\$ 0	\$ 0	\$ 1,296
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 2,993
	Number of retirees	2	6	3	2	1	0	0	14
2015	Average monthly benefit	\$ 0	\$ 977	\$ 1,735	\$ 2,162	\$ 0	\$ 0	\$ 0	\$ 1,315
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	10	2	3	0	0	0	15
2016	Average monthly benefit	\$ 0	\$ 1,048	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,048
	Average final salary	\$ 0	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	7	0	0	0	0	0	7
2017	Average monthly benefit	\$ 499	\$ 954	\$ 1,580	\$ 1,995	\$ 0	\$ 0	\$ 0	\$ 1,041
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	2	17	3	1	0	0	0	23
2018	Average monthly benefit	\$ 0	\$ 1,122	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,122
	Average final salary	\$ 0	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	6	0	0	0	0	0	6
2019	Average monthly benefit	\$ 0	\$ 1,017	\$ 1,496	\$ 2,117	\$ 2,744	\$ 0	\$ 0	\$ 1,327
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	21	2	6	1	0	0	30
2020	Average monthly benefit	\$ 499	\$ 956	\$ 1,621	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,053
	Average final salary	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	1	6	2	0	0	0	0	9
2021	Average monthly benefit	\$ 0	\$ 984	\$ 1,507	\$ 1,995	\$ 0	\$ 0	\$ 0	\$ 1,155
	Average final salary	\$ 0	\$ 2,993	\$ 2,993	\$ 2,993	\$ 0	\$ 0	\$ 0	\$ 2,993
	Number of retirees	0	23	4	3	0	0	0	30
2022	Average monthly benefit	\$ 511	\$ 964	\$ 1,864	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,028
	Average final salary	\$ 3,068	\$ 3,068	\$ 3,068	\$ 0	\$ 0	\$ 0	\$ 0	\$ 3,068
	Number of retirees	1	5	1	0	0	0	0	7
2023	Average monthly benefit	\$ 511	\$ 900	\$ 1,487	\$ 2,314	\$ 0	\$ 0	\$ 0	\$ 1,224
	Average final salary	\$ 3,142	\$ 3,142	\$ 3,142	\$ 3,142	\$ 0	\$ 0	\$ 0	\$ 3,142
	Number of retirees	1	11	8	2	0	0	0	22
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 448	\$ 989	\$ 1,549	\$ 2,105	\$ 2,744	\$ 0	\$ 0	\$ 1,190
	Average final average salary	\$ 3,025	\$ 3,011	\$ 3,044	\$ 3,011	\$ 2,993	\$ 0	\$ 0	\$ 3,016
	Number of retirees	7	112	25	17	2	0	0	163

Note: COLA increases are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Elected Officials in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2015	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2016	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2017	Average monthly benefit	\$ 0	\$ 2,993	\$ 3,099	\$ 0	\$ 5,576	\$ 0	\$ 0	\$ 3,889
	Average final salary	\$ 0	\$ 8,979	\$ 7,207	\$ 0	\$ 11,152	\$ 0	\$ 0	\$ 9,113
	Number of retirees	0	1	1	0	1	0	0	3
2018	Average monthly benefit	\$ 1,496	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 1,496
	Average final salary	\$ 8,979	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 8,979
	Number of retirees	1	0	0	0	0	0	0	1
2019	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2020	Average monthly benefit	\$ 0	\$ 3,234	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 3,234
	Average final salary	\$ 0	\$ 9,703	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 9,703
	Number of retirees	0	1	0	0	0	0	0	1
2021	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2023	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 1,496	\$ 3,114	\$ 3,099	\$ 0	\$ 5,576	\$ 0	\$ 0	\$ 3,279
	Average final average salary	\$ 8,979	\$ 9,341	\$ 7,207	\$ 0	\$ 11,152	\$ 0	\$ 0	\$ 9,204
	Number of retirees	1	2	1	0	1	0	0	5

Note: COLA increases are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Uniformed Water Patrol in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 0	\$ 0	\$ 780	\$ 0	\$ 0	\$ 0	\$ 0	\$ 780
	Average final salary	\$ 0	\$ 0	\$ 2,507	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,507
	Number of retirees	0	0	1	0	0	0	0	1
2015	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,539	\$ 4,539
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 6,321	\$ 6,321
	Number of retirees	0	0	0	0	0	0	1	1
2016	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,221	\$ 4,221
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 6,375	\$ 6,375
	Number of retirees	0	0	0	0	0	0	2	2
2017	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 1,079	\$ 0	\$ 0	\$ 0	\$ 1,079
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 2,846	\$ 0	\$ 0	\$ 0	\$ 2,846
	Number of retirees	0	0	0	1	0	0	0	1
2018	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 1,492	\$ 0	\$ 0	\$ 0	\$ 1,492
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 4,347	\$ 0	\$ 0	\$ 0	\$ 4,347
	Number of retirees	0	0	0	1	0	0	0	1
2019	Average monthly benefit	\$ 0	\$ 0	\$ 671	\$ 0	\$ 0	\$ 0	\$ 0	\$ 671
	Average final salary	\$ 0	\$ 0	\$ 2,659	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,659
	Number of retirees	0	0	1	0	0	0	0	1
2020	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2021	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 5,026	\$ 5,026
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 7,809	\$ 7,809
	Number of retirees	0	0	0	0	0	0	1	1
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
2023	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0
	Number of retirees	0	0	0	0	0	0	0	0
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 0	\$ 0	\$ 726	\$ 1,286	\$ 0	\$ 0	\$ 4,502	\$ 2,754
	Average final average salary	\$ 0	\$ 0	\$ 5,166	\$ 7,193	\$ 0	\$ 0	\$ 26,880	\$ 39,239
	Number of retirees	0	0	2	2	0	0	4	8

Note: COLA increases and temporary benefits payable under MSEP 2000 until age 62 are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Administrative Law Judges and Legal Advisors in the MSEP

Members Retiring During Fiscal Year		Years Credited Service by Category								All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+		
2014	Average monthly benefit	\$ 0	\$ 2,433	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,433	
	Average final salary	\$ 0	\$ 8,146	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 8,146	
	Number of retirees	0	1	0	0	0	0	0	1	
2015	Average monthly benefit	\$ 0	\$ 2,259	\$ 0	\$ 3,012	\$ 0	\$ 0	\$ 0	\$ 2,636	
	Average final salary	\$ 0	\$ 7,936	\$ 0	\$ 6,023	\$ 0	\$ 0	\$ 0	\$ 6,980	
	Number of retirees	0	1	0	1	0	0	0	2	
2016	Average monthly benefit	\$ 0	\$ 853	\$ 0	\$ 0	\$ 3,811	\$ 0	\$ 0	\$ 3,072	
	Average final salary	\$ 0	\$ 3,508	\$ 0	\$ 0	\$ 7,623	\$ 0	\$ 0	\$ 6,594	
	Number of retirees	0	1	0	0	3	0	0	4	
2017	Average monthly benefit	\$ 401	\$ 0	\$ 0	\$ 5,065	\$ 0	\$ 5,298	\$ 5,273	\$ 4,009	
	Average final salary	\$ 5,777	\$ 0	\$ 0	\$ 10,129	\$ 0	\$ 10,596	\$ 10,546	\$ 9,262	
	Number of retirees	1	0	0	1	0	1	1	4	
2018	Average monthly benefit	\$ 0	\$ 0	\$ 3,860	\$ 0	\$ 5,313	\$ 0	\$ 0	\$ 4,950	
	Average final salary	\$ 0	\$ 0	\$ 7,720	\$ 0	\$ 10,625	\$ 0	\$ 0	\$ 9,899	
	Number of retirees	0	0	1	0	3	0	0	4	
2019	Average monthly benefit	\$ 0	\$ 0	\$ 4,353	\$ 0	\$ 5,115	\$ 0	\$ 0	\$ 4,734	
	Average final salary	\$ 0	\$ 0	\$ 8,707	\$ 0	\$ 10,230	\$ 0	\$ 0	\$ 9,469	
	Number of retirees	0	0	1	0	1	0	0	2	
2020	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 4,630	\$ 5,323	\$ 0	\$ 4,861	
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 9,260	\$ 10,647	\$ 0	\$ 9,722	
	Number of retirees	0	0	0	0	2	1	0	3	
2021	Average monthly benefit	\$ 1,001	\$ 1,559	\$ 0	\$ 0	\$ 5,115	\$ 4,926	\$ 0	\$ 3,150	
	Average final salary	\$ 4,969	\$ 4,828	\$ 0	\$ 0	\$ 10,230	\$ 9,851	\$ 0	\$ 7,470	
	Number of retirees	1	1	0	0	1	1	0	4	
2022	Average monthly benefit	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 5,323	\$ 0	\$ 5,323	
	Average final salary	\$ 0	\$ 0	\$ 0	\$ 0	\$ 0	\$ 10,647	\$ 0	\$ 10,647	
	Number of retirees	0	0	0	0	0	1	0	1	
2023	Average monthly benefit	\$ 1,030	\$ 1,913	\$ 3,750	\$ 0	\$ 0	\$ 0	\$ 0	\$ 2,152	
	Average final salary	\$ 7,808	\$ 5,708	\$ 7,500	\$ 0	\$ 0	\$ 0	\$ 0	\$ 6,681	
	Number of retirees	1	2	1	0	0	0	0	4	
Ten Years Ended June 30, 2023										
	Average monthly benefit	\$ 811	\$ 1,822	\$ 3,988	\$ 4,039	\$ 4,686	\$ 5,218	\$ 5,273	\$ 3,669	
	Average final average salary	\$ 6,185	\$ 5,972	\$ 7,976	\$ 8,076	\$ 9,372	\$ 10,435	\$ 10,546	\$ 8,292	
	Number of retirees	3	6	3	2	10	4	1	29	

Note: COLA increases are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' MSEP Actuarial Valuation Report; prior to FY23 from MOSERS' Pension Administration System

Average Monthly Benefit Amounts (continued)

Last Ten Fiscal Years

Judicial Plan

Members Retiring During Fiscal Year		Years Credited Service by Category							All Members
		<5	5-10	11-15	16-20	21-25	26-30	31+	
2014	Average monthly benefit	\$ 0	\$ 2,310	\$ 4,571	\$ 5,151	\$ 5,117	\$ 4,869	\$ 5,293	\$ 4,313
	Average final salary	\$ 0	\$ 8,259	\$ 9,143	\$ 10,303	\$ 10,233	\$ 9,738	\$ 10,585	\$ 9,435
	Number of retirees	0	4	6	3	3	1	1	18
2015	Average monthly benefit	\$ 1,114	\$ 3,140	\$ 5,572	\$ 5,572	\$ 5,970	\$ 5,572	\$ 5,848	\$ 5,392
	Average final salary	\$ 11,143	\$ 9,419	\$ 11,143	\$ 11,143	\$ 11,940	\$ 11,143	\$ 11,697	\$ 11,253
	Number of retirees	1	3	7	10	7	4	7	39
2016	Average monthly benefit	\$ 0	\$ 4,193	\$ 5,575	\$ 5,452	\$ 6,166	\$ 5,844	\$ 0	\$ 5,545
	Average final salary	\$ 0	\$ 11,688	\$ 11,503	\$ 10,903	\$ 12,332	\$ 11,688	\$ 0	\$ 11,569
	Number of retirees	0	2	3	5	4	2	0	16
2017	Average monthly benefit	\$ 602	\$ 4,487	\$ 5,506	\$ 6,054	\$ 5,878	\$ 6,178	\$ 5,931	\$ 5,293
	Average final salary	\$ 8,136	\$ 11,696	\$ 11,367	\$ 12,108	\$ 11,756	\$ 12,355	\$ 11,861	\$ 11,574
	Number of retirees	2	3	2	4	6	4	2	23
2018	Average monthly benefit	\$ 0	\$ 4,549	\$ 5,525	\$ 6,114	\$ 5,989	\$ 6,238	\$ 6,365	\$ 5,955
	Average final salary	\$ 0	\$ 12,477	\$ 11,947	\$ 12,227	\$ 11,978	\$ 12,477	\$ 12,730	\$ 12,259
	Number of retirees	0	1	4	4	4	4	3	20
2019	Average monthly benefit	\$ 603	\$ 0	\$ 5,658	\$ 6,025	\$ 6,037	\$ 6,074	\$ 6,074	\$ 5,653
	Average final salary	\$ 9,520	\$ 0	\$ 11,371	\$ 12,051	\$ 12,075	\$ 12,147	\$ 12,147	\$ 11,758
	Number of retirees	2	0	10	13	7	2	4	38
2020	Average monthly benefit	\$ 0	\$ 3,163	\$ 5,389	\$ 6,415	\$ 6,237	\$ 6,256	\$ 6,415	\$ 5,875
	Average final salary	\$ 0	\$ 12,653	\$ 10,927	\$ 12,830	\$ 12,501	\$ 12,511	\$ 12,830	\$ 12,132
	Number of retirees	0	1	5	1	7	4	1	19
2021	Average monthly benefit	\$ 633	\$ 4,525	\$ 5,961	\$ 6,229	\$ 6,319	\$ 7,049	\$ 6,672	\$ 6,017
	Average final salary	\$ 12,653	\$ 13,164	\$ 11,923	\$ 12,457	\$ 12,638	\$ 14,099	\$ 13,345	\$ 12,738
	Number of retirees	1	1	5	7	2	3	3	22
2022	Average monthly benefit	\$ 0	\$ 2,710	\$ 6,218	\$ 6,469	\$ 6,729	\$ 6,606	\$ 6,616	\$ 6,173
	Average final salary	\$ 0	\$ 9,374	\$ 12,736	\$ 12,937	\$ 13,459	\$ 13,211	\$ 13,233	\$ 12,779
	Number of retirees	0	2	4	3	5	3	4	21
2023	Average monthly benefit	\$ 0	\$ 0	\$ 6,162	\$ 6,498	\$ 6,360	\$ 6,614	\$ 6,388	\$ 6,443
	Average final salary	\$ 0	\$ 0	\$ 12,652	\$ 12,996	\$ 12,720	\$ 13,045	\$ 12,775	\$ 12,893
	Number of retirees	0	0	7	12	5	11	3	38
Ten Years Ended June 30, 2023									
	Average monthly benefit	\$ 693	\$ 3,421	\$ 5,615	\$ 6,013	\$ 6,101	\$ 6,300	\$ 6,198	\$ 5,712
	Average final average salary	\$ 9,851	\$ 10,400	\$ 11,422	\$ 12,027	\$ 12,205	\$ 12,547	\$ 12,396	\$ 11,894
	Number of retirees	6	17	53	62	50	38	28	254

Note: COLA increases are excluded from the above for comparison purposes.

Source: FY23 from MOSERS' Judicial Plan Actuarial Valuation Reports; prior to FY23 from MOSERS' Pension Administration System

Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement

As of June 30, 2023

MSEP

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1983 and prior	22	\$ 135,640	\$ 514
1984	11	97,276	737
1985	20	171,001	713
1986	27	255,840	790
1987	40	444,648	926
1988	47	808,681	1,434
1989	61	1,208,721	1,651
1990	67	1,015,946	1,264
1991	100	2,118,866	1,766
1992	142	2,707,084	1,589
1993	198	4,226,424	1,779
1994	208	4,180,578	1,675
1995	320	6,440,594	1,677
1996	366	8,163,674	1,859
1997	408	8,823,839	1,802
1998	500	11,466,607	1,911
1999	618	14,073,594	1,898
2000	691	15,358,145	1,852
2001	1,562	34,104,295	1,819
2002	1,107	21,159,964	1,593
2003	1,246	24,804,645	1,659
2004	1,756	32,845,880	1,559
2005	1,237	21,379,726	1,440
2006	1,428	23,319,383	1,361
2007	1,721	28,947,190	1,402
2008	1,762	28,542,378	1,350
2009	1,852	30,442,894	1,370
2010	1,942	30,613,073	1,314
2011	2,506	41,378,158	1,376
2012	2,368	36,217,526	1,275
2013	2,473	36,482,966	1,229
2014	2,482	37,434,444	1,257
2015	2,810	43,444,846	1,288
2016	2,811	44,501,807	1,319
2017	2,769	47,892,097	1,441
2018	2,914	50,361,358	1,440
2019	2,664	45,995,650	1,439
2020	2,642	43,543,262	1,373
2021	3,019	52,587,849	1,452
2022	3,263	56,553,689	1,444
2023	2,529	43,599,118	1,437
	54,709	\$ 937,849,356	\$ 1,429

Source: MOSERS' MSEP Actuarial Valuation Report as of June 30, 2023

Retirees and Beneficiaries Tabulated by Fiscal Year of Retirement (continued)

As of June 30, 2023

Judicial Plan

Fiscal Year of Retirement	Number	Total Annual Benefit	Average Monthly Benefit
1983 and prior	3	\$ 60,072	\$ 1,669
1984	0	0	0
1985	0	0	0
1986	0	0	0
1987	5	266,236	4,437
1988	0	0	0
1989	1	31,956	2,663
1990	2	71,709	2,988
1991	5	240,921	4,015
1992	1	93,820	7,818
1993	3	152,857	4,246
1994	2	100,452	4,186
1995	6	459,324	6,380
1996	3	179,976	4,999
1997	4	272,628	5,680
1998	7	431,508	5,137
1999	7	445,908	5,308
2000	6	521,244	7,240
2001	13	1,261,392	8,086
2002	12	1,074,199	7,460
2003	12	1,012,272	7,030
2004	12	921,912	6,402
2005	12	1,218,641	8,463
2006	10	424,300	3,536
2007	38	3,072,744	6,738
2008	21	1,635,963	6,492
2009	29	1,934,630	5,559
2010	12	828,732	5,755
2011	30	2,199,898	6,111
2012	15	873,238	4,851
2013	26	2,025,002	6,490
2014	20	1,350,208	5,626
2015	47	4,025,232	7,137
2016	20	1,632,464	6,802
2017	29	2,205,517	6,338
2018	31	2,603,339	6,998
2019	43	3,473,302	6,731
2020	25	1,913,223	6,377
2021	30	2,161,150	6,003
2022	33	2,357,054	5,952
2023	44	3,483,913	6,598
	619	\$ 47,016,936	\$ 6,330

Source: MOSERS' Judicial Plan Actuarial Valuation Report as of June 30, 2023

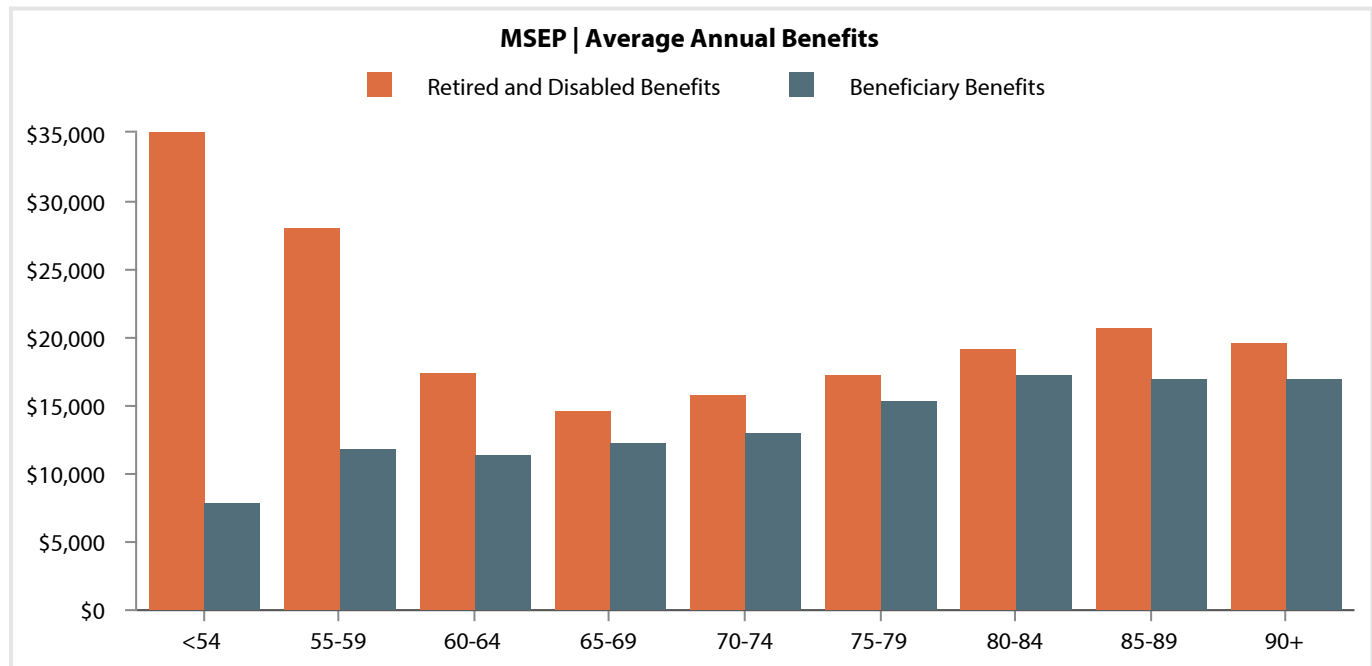
Benefits Tabulated by Attained Ages of Benefit Recipients

As of June 30, 2023

MSEP

Attained Ages	Retired and Disabled		Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
<54	476	\$ 17,151,876	555	\$ 4,410,936	1,031	\$ 21,562,812
55-59	2,747	77,024,916	314	3,761,268	3,061	80,786,184
60-64	7,556	132,286,140	511	5,859,024	8,067	138,145,164
65-69	11,593	170,715,912	781	9,697,188	12,374	180,413,100
70-74	11,453	182,000,928	1,049	13,711,236	12,502	195,712,164
75-79	7,798	135,582,132	969	14,956,128	8,767	150,538,260
80-84	4,005	77,412,000	896	15,596,940	4,901	93,008,940
85-89	1,885	38,963,184	688	11,757,324	2,573	50,720,508
90+	959	18,900,684	474	8,061,540	1,433	26,962,224
Totals	48,472	\$ 850,037,772	6,237	\$ 87,811,584	54,709	\$ 937,849,356

Average age at retirement: 61.3 years • Average age now: 71.6 years



Average annual benefit : \$17,537 retired and disabled • \$14,079 beneficiaries

Source: MOSERS' MSEP Actuarial Valuation Report as of June 30, 2023

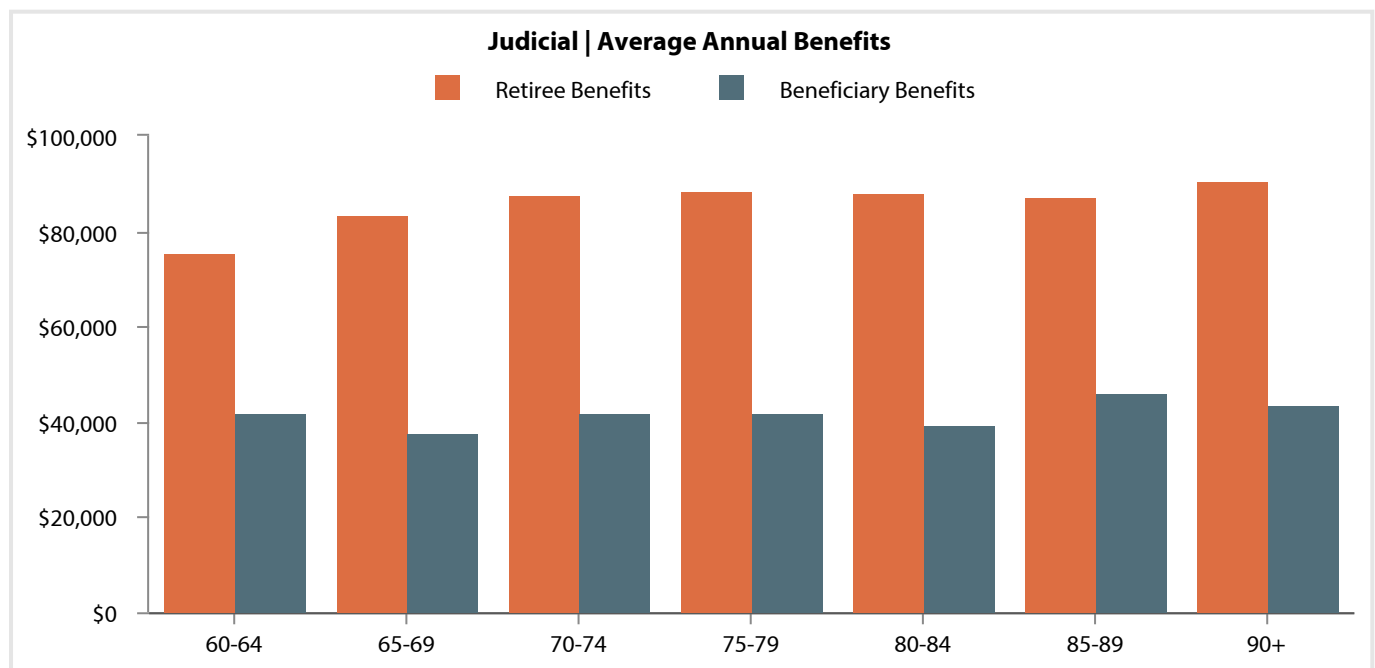
Benefits Tabulated by Attained Ages of Benefit Recipients (continued)

As of June 30, 2023

Judicial Plan

Attained Ages	Retirees		Beneficiaries		Totals	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
60-64	29	\$ 2,190,252	9	\$ 377,472	38	\$ 2,567,724
65-69	64	5,363,628	16	604,512	80	5,968,140
70-74	145	12,720,948	17	711,420	162	13,432,368
75-79	120	10,624,212	33	1,382,136	153	12,006,348
80-84	59	5,195,916	24	944,304	83	6,140,220
85-89	29	2,533,236	21	972,540	50	3,505,776
90+	23	2,089,464	30	1,306,896	53	3,396,360
Totals	469	\$ 40,717,656	150	\$ 6,299,280	619	\$ 47,016,936

Average age at retirement: 65.8 years • Average age now: 76.8 years



Average annual benefit: \$86,818 retirees • \$41,995 beneficiaries

Source: MOSERS' Judicial Plan Actuarial Valuation Report as of June 30, 2023

Principal Participating Employers

Current Year and Nine Years Ago

Participating Employer	2023			2014		
	Covered Employees	Rank	Percent of Membership	Covered Employees	Rank	Percent of Membership
State of Missouri	38,109	1	86.9%	44,228	1	86.8%
Missouri State University	1,784	2	4.0	1,870	2	3.7
University of Central Missouri	820	3	1.9	1,062	3	2.1
Southeast Missouri State University	680	4	1.6	934	4	1.8
Northwest Missouri State University	558	5	1.3	573	6	1.1
Truman State University	468	6	1.1	635	5	1.2
Missouri Southern State University	319	7	0.7	450	7	0.9
Missouri Western State University	294	8	0.7	410	8	0.8
Lincoln University	270	9	0.6	368	9	0.7
State Technical College of Missouri	203	10	0.5	168	10	0.3
All others	287		0.7	328		0.6
Total	43,792		100.0%	51,026		100.0%

Source: MOSERS' Pension Administration System

This publication may be provided in alternative formats.
To obtain accessible formats, please contact MOSERS at (573) 632-6100 or (800) 827-1063.
Relay Missouri numbers are 711 (Voice) or (800) 735-2966 (TTY).

MOSERS is an equal opportunity employer.

The following disclosures and disclaimers apply to certain information in this annual report.

Source: Bloomberg Index Services Limited. BLOOMBERG® is a trademark and service mark of Bloomberg Finance L.P. and its affiliates (collectively “Bloomberg”). Bloomberg or Bloomberg’s licensors, own all proprietary rights in the Bloomberg Barclays Indices. Bloomberg neither approves or endorses this material, or guarantees the accuracy or completeness of any information herein, or makes any warranty, express or implied, as to the results to be obtained therefrom and, to the maximum extent allowed by law, shall not have any liability or responsibility for injury or damages arising in connection therewith.

Copyright 2023, S&P Global Market Intelligence (and its affiliates as applicable). Reproduction of any information, data or material, including ratings (“Content”) in any form is prohibited except with the prior written permission of the relevant party. Such party, its affiliates and suppliers (“Content Providers”) do not guarantee the accuracy, adequacy, completeness, timeliness or availability of any Content and are not responsible for any errors or omissions (negligent or otherwise), regardless of the cause, or for the results obtained from the use of such Content. In no event shall Content Providers be liable for any damages, costs, expenses, legal fees, or losses (including lost income or lost profit and opportunity costs) in connection with any use of the Content. A reference to a particular investment or security, a rating or any observation concerning an investment that is part of the content is not a recommendation to buy, sell or hold such investment or security, does not address the suitability of an investment or security and should not be relied on as investment advice. Credit ratings are statements of opinions and are not statements of fact.



PO Box 209 • Jefferson City, MO 65102
(573) 632-6100 • (800) 827-1063

Visit us at 907 Wildwood Drive or online at www.mosers.org.

Contact MOSERS if you need an alternative format of this publication.